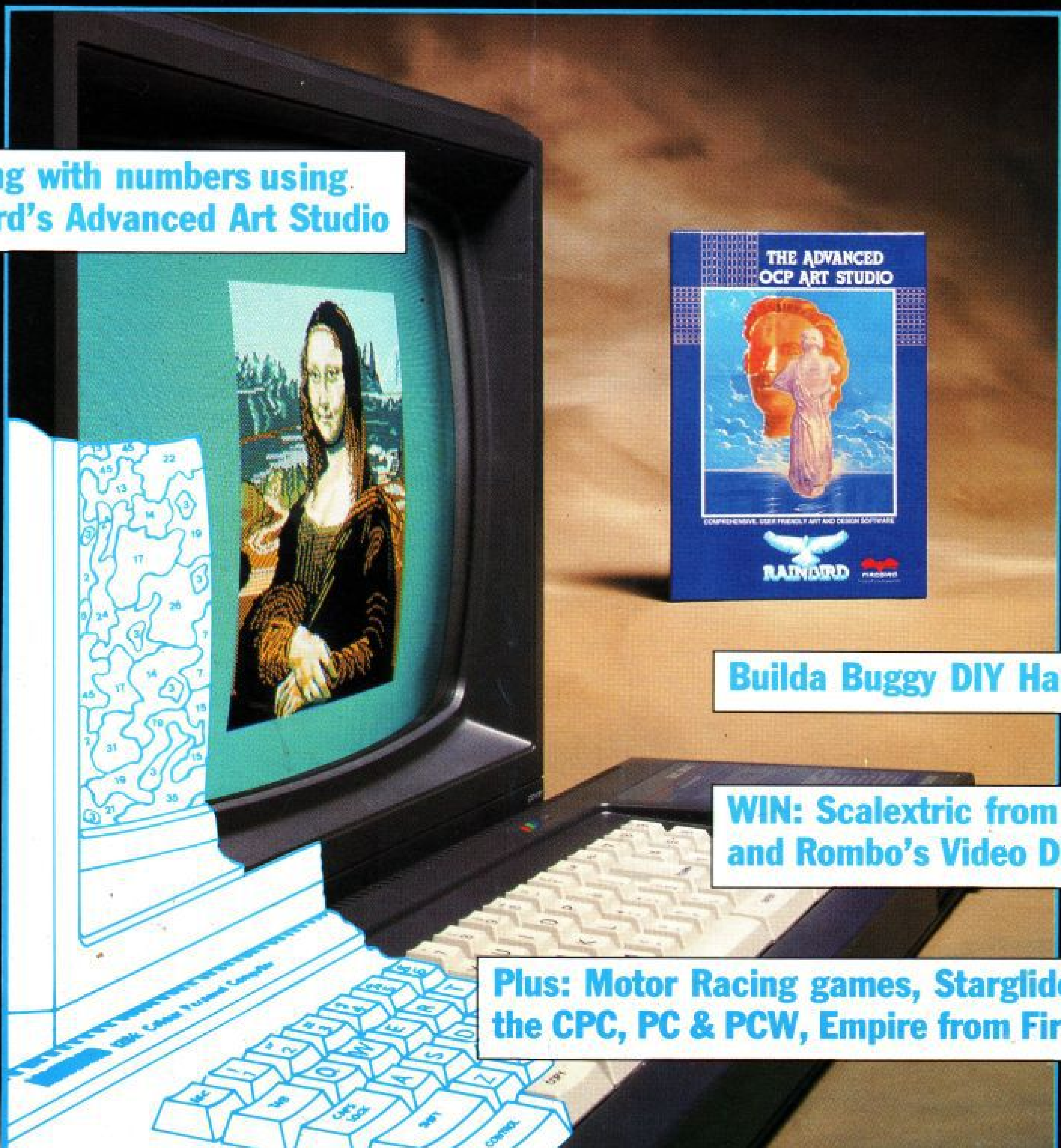
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AMSTRAD COMPUTER USER



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Your Amstrad has 256k or 128k to play with. It seems a pity just to play.

The Amstrad 8256 and 6128 are extraordinary machines with random access memory that lifts them far above the home computer norm.

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The most complete PASCAL £49.95.

PASCAL/MT+ is full ISO standard PASCAL, extended to provide a comprehensive professional programming environment for industrial, business and educational applications.

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The package includes a compiler to generate relocatable object files; a linker to generate executable files from compiler outputs; a run-time support library covering transcendental functions, machine interrupts and other tasks; a disassembler and a symbolic debugger.

As well as standard ISO numerics, PASCAL/MT+ supports BCD and floating point real numbers for arithmetic precision. Special features reduce program size and enhance I/O capabilities. PASCAL/MT+ is the fully implemented PASCAL you can start with, stay with and never outgrow.

Ten times faster with CBASIC £49.95.

CBASIC Compiler is a native code compiler that allows separate modules to be written, tested and combined to create a complete program. And it combines machine code speed with BASIC ease to produce programs that execute eight to ten times faster than the same interpreted programs.

A fully integrated set of device independent graphics statements and functions permits direct output to any graphics peripheral without recompiling.

Extended precision 14-digit decimal arithmetic ensures that fractional parts of pound amounts are exact and ledgers balance to the penny.

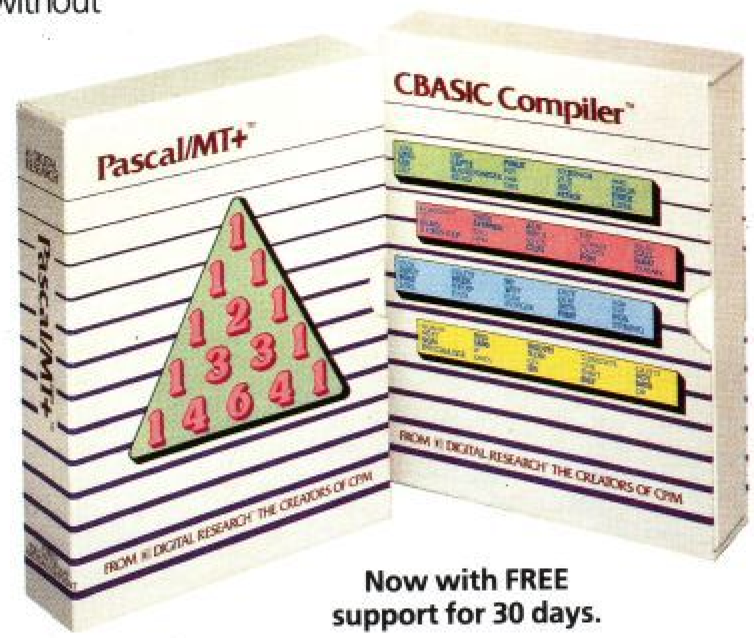
CBASIC Compiler also supports integer arithmetic, so you can use integer variables to increase execution speed.

Multiple line function capability with multiple parameters provides features found in block-structured languages. Local variables can be declared in an MLF. MLF functions may be declared as external, belonging to an entirely different program module.

Development Potential.

PASCAL/MT+ and CBASIC Compiler run on the Amstrad CPC 6128, PCW 8256, CPC 664 and CPC 464 with DD-1 disk drive. Use of graphics with CBASIC Compiler is only available on CPC 6128 and PCW 8256.

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PROGRAMMING

AMSTRAD COMPUTER USER

The official magazine for all users of Amstrad computers

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New comms package for CPC 6128

A new terminal package is to be launched by Monflair for the CPC 6128 range of computers. The disc based software will work with all interfaces built to the specification outlined in the Amstrad firmware manual. These include the Pace, Honeysoft and both the new and old Amstrad serial interfaces.

The package is referred to by the authors as being a full workstation. Written with Hi-Softs' Devpac, the program has been two years in the making and runs under CP/M+.

The full spec viewdata terminal supports telesoftware, double height, flashing, a full eight colours, conceal and reveal and we expect dynamic frames. It is possible to write mailboxes off line and send them at high speed when you log in. This saves time and cuts down on telephone bills.

Two screen dumps are available, a rapid text dump and a shaded Epson screen dump. The software will be available shortly and cost £39. For more details contact Monflair on 01-367-1777.



Michael Caine, star of The Fourth Protocol, outside the Cabinet office.

The second and third 4th Protocols

Someone, somewhere in Britain is building an atomic bomb. He is a top KGB agent, the smartest they've got. With only a deep belief that this is what's going on, and the slightest of clues, you must find and stop him.

An excellent new film telling the story is doing the rounds. Go and see it, if only to watch a transit van being driven like a rally car. The hero is John Preston, played by Michael Caine, who solves the crime with the help of a BBC Micro.

Sounds ideal for a computer game really. And indeed it is. The fourth Protocol – the game is an adventure using icons and ciphers rather than text. Ariolasoft produced the first Amstrad version of this adventure quite a while back. It runs on the CPC and is worth looking out for.

To coincide with the film release Ariolasoft has launched PCW and PC versions of the game. Ideal for some cerebral exercise.

DK'Tronics clock on

Two years ago Amstrad user ran its first hardware project. The second one is in this month! Now DK has launched a peripheral for the CPC which does the same job as that ancient project, only with a bit more finesse.

It is a battery backed-up clock, just like the one Amstrad include with the PC 1512. It stores information when you switch the computer off. This includes a clock which can be switched from 12 to 24 hour notation. End of month and leap years are catered for in the calendar function and you can have a daily alarm.

It also includes 50 bytes of battery backed-up ram for important data and will work with CP/M and CP/M+. There is an 8 bit I/O port for control applications. The battery is re-charged from the Amstrad, so providing you use your Amstrad occasionally the data should be safe. More details from DK'Tronics on 0493 602926

CRL reveal a warped mind

In the never ending quest for a new approach to software, CRL has announced a number of new programs. The most mundane of these is Sun Star. According to the press release 'You are destined for the Xxarian Star Corporation solar energy grid to collect energy' (what else – Ed).

It goes on 'However, due to a build up of unstable energy pulses, that task is far from easy'. Basically it's a jolly good shoot-em-up which will cost £7.95 on tape and £14.95 on disc.

The releases continue as the gore sets in. 'Gothic Horror from CRL'. This is a three part Frankenstein adventure with reportedly terrifying sound effects and a price tag reading £9.95 on the tape or £14.95 on disc.

Then the bumf plumbs the depths. 'CRL licenses Oink!'. This is not a particularly horrific press release. It tells of a game in which you play the part of Uncle Pigg, the world-famous editor of the magazine and have to be promoted from tea boy to editor. (Same thing in this place – Ed). What is horrific is that they keep sending copies of the magazine. It's sick, vile and absorbing.

No one fooled

Amstrad User's scoop news feature on Amstrad's sky rocket in the April issue of ACU does not seem to have fooled anyone. It was of course an April Fool. But how may of the clues did you spot? The acronyms APRIL, LOCOSCRIPT and even April FOOL worked into the script. Little touches like the date at the bottom and large hints like the satellite footprint should have helped you twig.



Jailbreak winner

Johnathan Morrice of Great Yarmouth is the winner of the Konami Jailbreak machine. The full size arcade machine is now sitting in his hall. The response to the competition was fantastic. Thank you to everyone who took part.

The correct answers were 1. b, 2. c, 3. a, 4. c. To award the prize to Johnathan, Luther De Gale of Konami UK, Hiro Maruo of Konami Europe and Mike Daniels of NMC (the company which handled the home computer conversion) came into the office. Our photograph shows Johnathan and Mr Maruo with the prize.



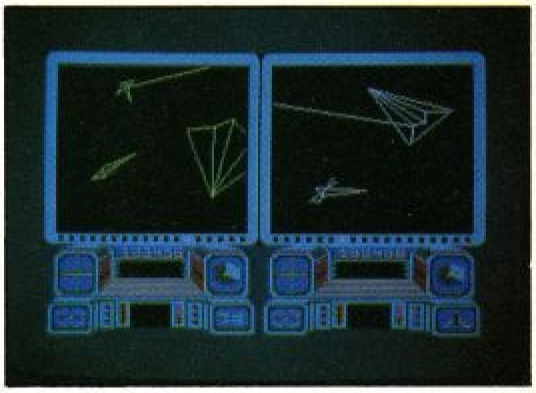
Rupert Bowater and Paul Norris of Binary Design

Tropical quest at the Palace

Well not actually *the* Palace, more a Palace. In this case Palace Software. They will be releasing Stifflip & Co. The game is described as "a multi-role action back-packed adventure". It consists of two parts, "Out For The Count" and "The Final Countdown".

Programmed by Binary Vision, Veterans of Zoids and The Fourth Protocol, the game centres around Sebastian Stifflip and his quest for Count Chamelion.

Starlight dawns



Dogfight

Two new games will be out soon from Starlight, the sister company to Ariolasoft. The first game is Dogfight 2187 and looks a little like Top Gun. The 3D vector graphics portray your role as Dexter. You must search the skies for pieces of the Spatial Generator. This will prevent an attack by hordes of marauding alien invaders.

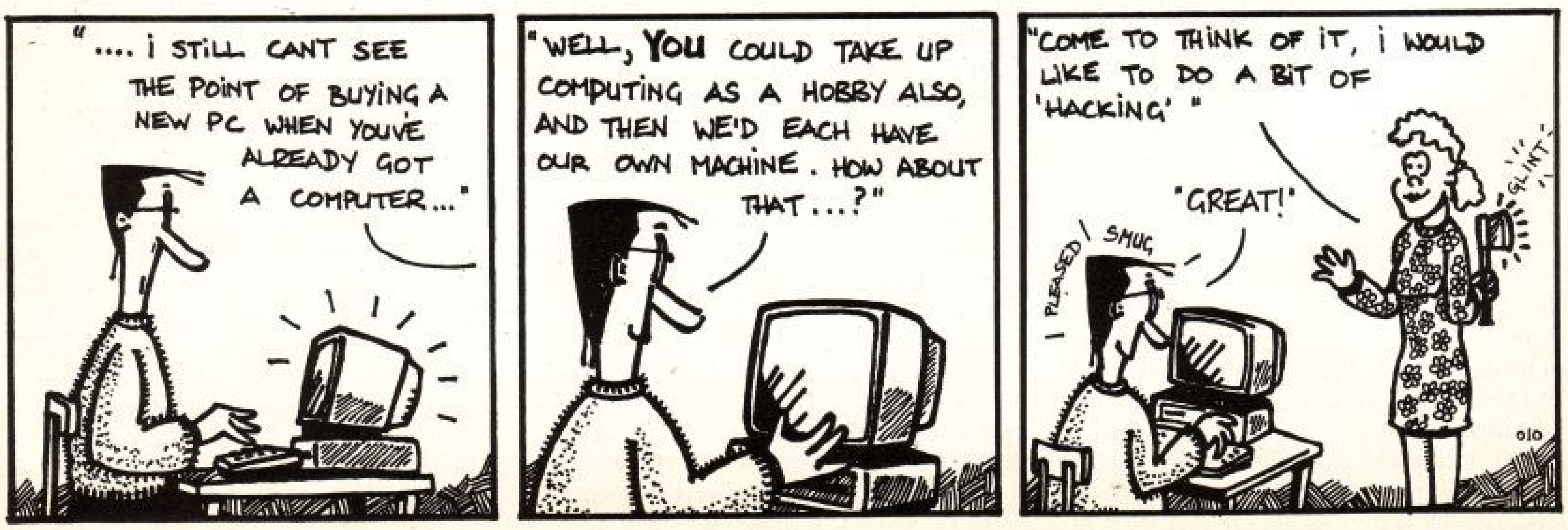
The second title is Deathscape, which uses the old sci-fi plot of two nations putting up a champion in one-to-one combat rather than fighting an all-out war.

You play the hero volunteered by the Sol Federation, put into battle against a single Varg ship. Unfortunately the Varg's cheat and have sent a squadron against you. The arena is known as the Deathscape, and only one ship will escape alive. Make sure that ship is yours.



Deathscape

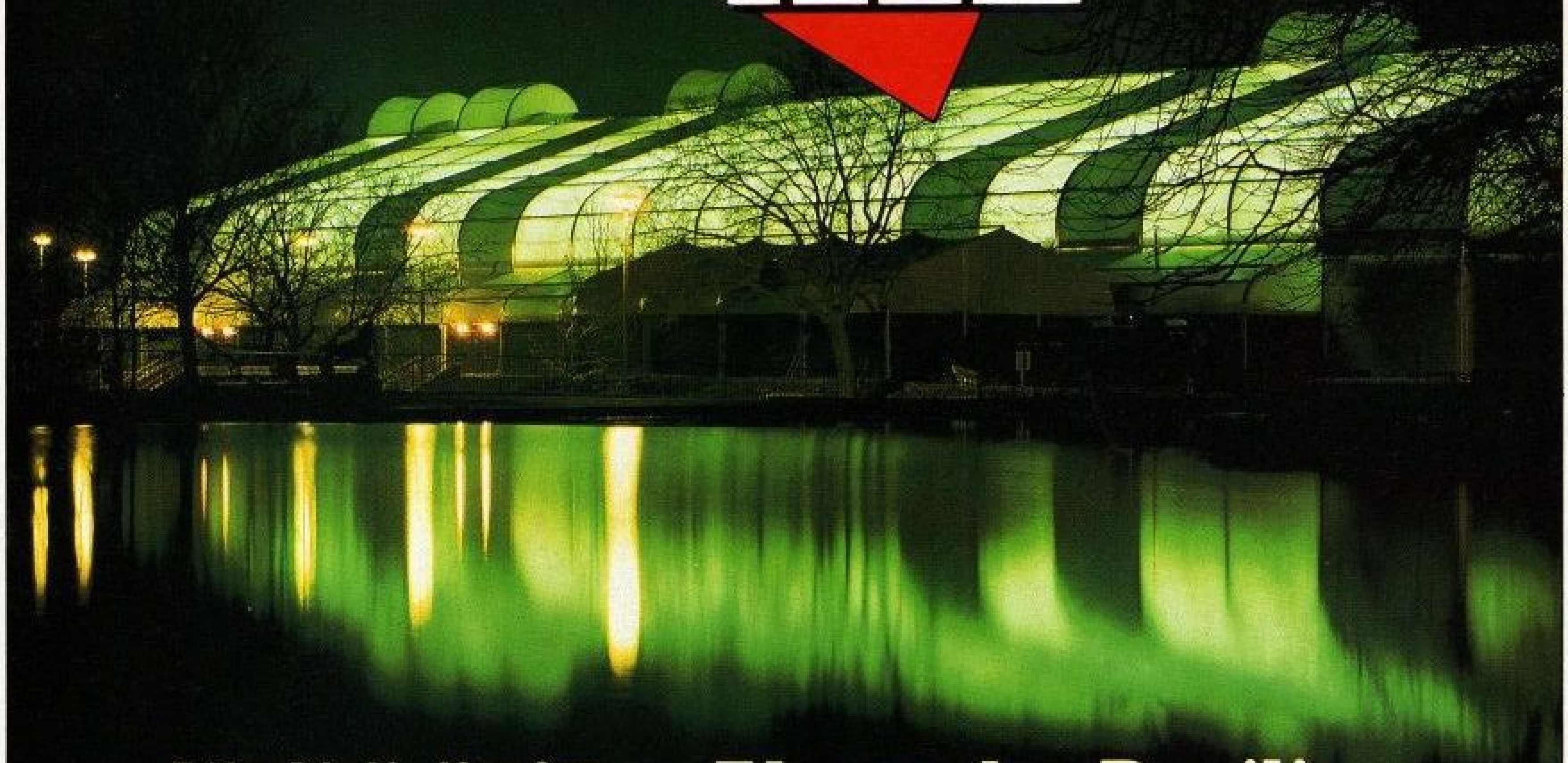
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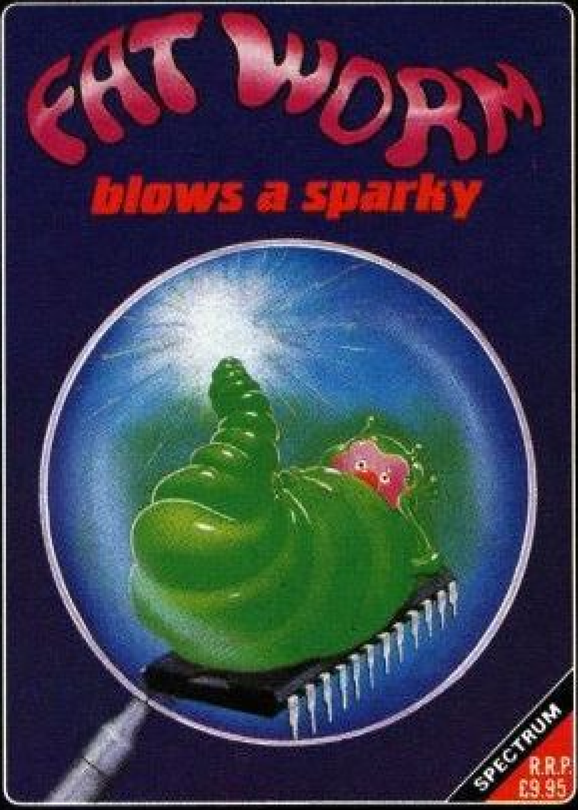
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Please quote credit card number and full address + Ref. ACUS5

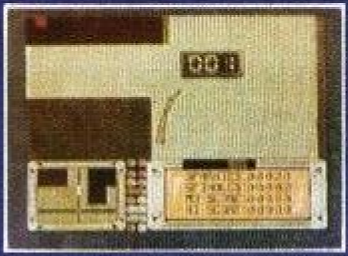
FAT WORM BLOWS A SPARKY

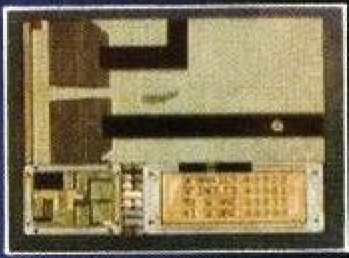
Now for something completely different. You are an insidious little wormie being chased through a Sinclair Spectrum by creepers in sputniks and crawlers on feets. Defend yourself by shooting burper sparkies at the crawlers, and blaster sparkies to take-out the sputniks. You'll see the computer board in a smooth-scrolling 3D viewed from above, as you crawl around in search of a disk drive on which to clone yourself.

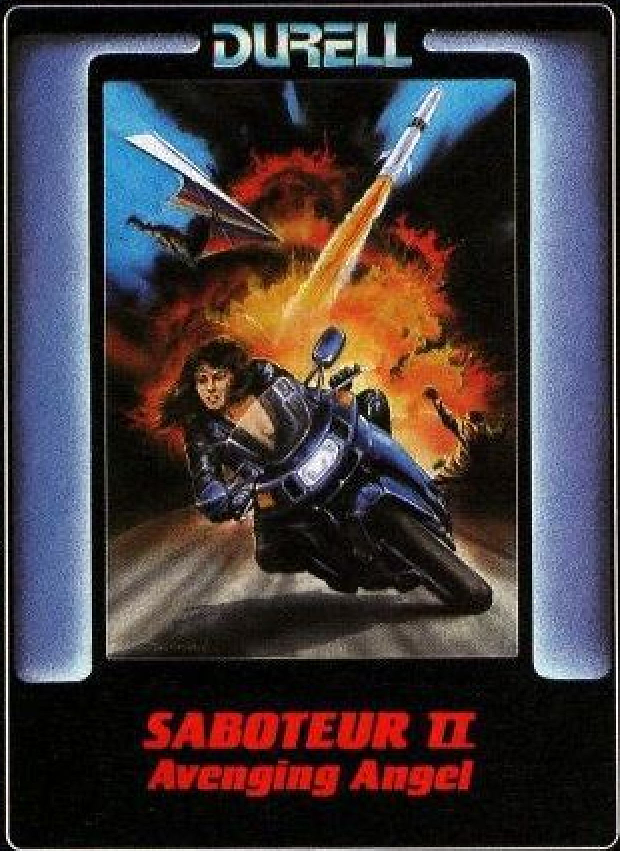
"Playability and addictiveness are of the highest standard, but as for the graphics – well, what can I say? As far as animation and solid 3D goes, this is probably the best I have ever seen" CRASH, November 1986 (overall rating 95%)

£9.95 Spectrum cassette only









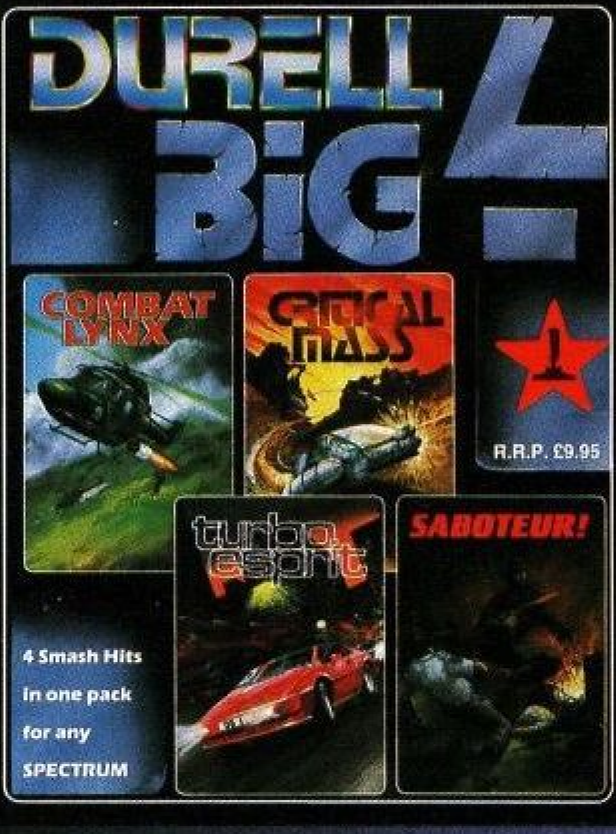
SABOTEUR II – Avenging Angel

A follow-up by the original author, where as the Ninja's beautiful sister, your mission is to revenge your fatally wounded brother. The rebels have found that the disk he stole in "SABOTEUR" also contains data for one of the dictator's missile silos. Your job is to fly in by hang-glider, fight your way through the security guards, pumas, dogs and radio-controlled robots, to seek out some top secret punched tape to activate the missile's launch control. Launch it, disable the electric perimeter fence, then break-out by motor-bike. Over five hundred locations, three buildings, underground caverns, intelligent guard dogs and stupid guards.

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BIG 4

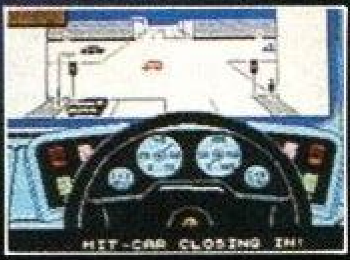
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"All of these megagames charted, all of 'em are winners. If you've spent the last eighteen months begging, borrowing and swopping trying to get hold of these titles, now you can relax|Only Beethoven's Quartets beat this fun foursome – Gimme! Gimme! Gimme! YOUR SINCLAIR, December 1986 (overall rating 9 out 10)

"Unlike most compilations where one title carries the others, the BIG 4 are actually four big games...A collection worth collecting." C & VG, December 1987

£9.95 Spectrum cassette
£9.95 Amstrad cassette, £11.95 Amstrad disk (£9.95 by mail order)
£9.95 Commodore 64 cassette (also on two "Duo-Disks" at £9.95 each)





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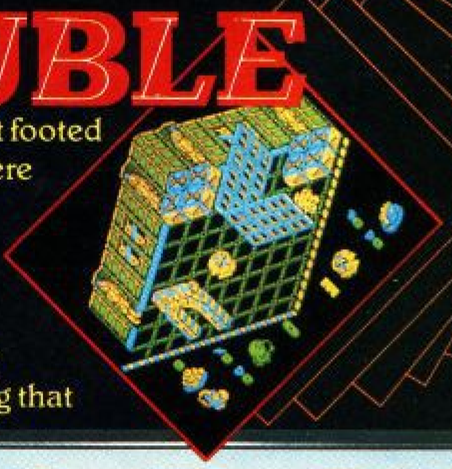
All Durell games are also available by mail order, with no charge for postage or packing. Just include a postal order or cheque made payable to "Durell Software Ltd", along with your name and address, your computer, and the title of the game you wish to purchase. Your game will be sent by return-of-post. **Note: Amstrad disks** are only £9.95 by mail order!

NOW FROM THE AUTHORS OF BATMAN COMES...



DOUBLE TROUBLE

Hi! My name's Mr. Head. Some say I'm the one with the brains but I don't think my flat footed friend would agree. I'm a real sharp shooter, but without my pal Mr. Heals I'd get nowhere fast... or slow! I can jump like a flea and even glide but Heals is the Daley Thompson of the two of us – he's FAST! Together, if we can find each other, we really do make an awesome twosome, and that's the only way we can overcome the emperor Blacktooth. The last time we entered Castle Blacktooth we found the crowns of THREE of the supressed kingdoms but by that time I'd run out of doughnut ammunition and my buddy was lost somewhere in the Safari world – it was the closest we had come to defeating that rapscallion – we were jumping for joy, splitting our sides, dying with laughter... we were Head over Heals!



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New leaf needed

After all the delays, the Advanced Memory Systems AMX Pagemaker finally appeared for the Amstrad computers.

After all my big expectations, I was very sadly let down when I received my copy and tried using it on my 6128.

The program appears to have been put on the market without even the most basic quality control and it can only be described as useless, since some of the most elementary functions do not work of work incorrectly.

For example, Text Windows are inoperative and any attempt at a printout produces a picture that is a distorted blur. It is certainly not my Mannesmann Tally that is at fault since it is listed by AMS as compatible.

Considering that it costs £50, I think it disgraceful that software is put on the market in such condition. It reminds me of some of the bad untested software that was available in the early days of home micros.

I have returned my disc to AMS and hope that they can come up with a new page(maker).

C.R.Grey,
Rio de Janeiro,
Brazil.

LD: *We've had a copy of Pagemaker in for review, and as you say it is often lacking. We have decided to wait until the bugs are fumigated.*

Both Mirrorsoft and AMX announced desktop publishing programs for the CPC a long, long time ago. They both underestimated the time it would take and have failed to come up with the goods.

If you are desperate for a DTP package then what works of Pagemaker is excellent, and they will upgrade it for you later.



Live long and prosper

I am writing to the person who created the cover photograph for the March '87 issue of ACU. Did you make that spacecraft, and did you create the laser beams by printing over the photograph? Are you an artist who uses a camera instead of paints? How did you manage to use half a dozen shiny new computers in your picture – I doubt that you own them all?

Patrick Lee,
Cheshunt.

LD: *Genius behind the lens is Martyn Howett who does most of the photography in ACU including last months fabbo cover. He is the one standing between the chips on page 54 of the April issue. The spaceship was built by Daniel Shandrake and the laser beam was put on by cutting a shaped hole in the background and covering it with a red film. The machines in the photo are not so new and you can see the scratches. We had to borrow some of them.*



The Rainbird has flown

Readers like myself who took advantage of your recent offers for Rainbird software are in for a nasty shock should they find problems with their disc, or wish to update their music system (as I did).

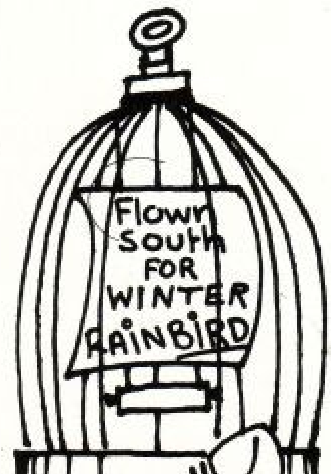
Rainbird tell their users to return their discs to a particular address. The Post Office promptly sends them back as 'address gone away'.

Faced with this, and noting that Rainbird belong to British Telecom, I duly presented the problem to the local telephone operators who did their best.

I eventually ended up talking to a puzzled but courteous chap in London who tried hard and eventually came up with a telephone number.

So I got the people at last, and extracted their new address from them. It is the same as Firebird, who also don't advertise in your journal, and it was changed last May.

I eventually got my update. And, oh yes, Rainbird still gives the wrong address on the new package. They didn't apologise either. When you are



attached to a big company, why bother about the customer?

Rainbird address is: 74 New Oxford St. London, W31A 1PF

James McKnight,
Cheshire.

LD: *I spoke to someone at Rainbird. He said that Wellington House is the head office for New Information Services (NIS) and that Rainbird is part of Telecomsoft which is part of NIS. So all the post to Wellington House should be redirected.*

The number is in the London phone book, so directory enquiries should have been able to tell you that you need 01-240-8838.

In Defence of Protext

(As if it needed defending – Ed)

I would like to congratulate you on the review of the CP/M version of Protext. On the whole I found it to be a fairly accurate assessment of its capabilities.

I appreciate that it is very hard to provide a 100 per cent accurate review of such a complete program as Protext in the limited time available to a reviewer.

As the author of the manual and therefore well acquainted with Protext, I feel that one or two points mentioned in the review might need clarifying.

Protext does in fact know exactly where page breaks fall at all times, and the information on the status lines gives full details of page, line, and column numbers at all times.

These figures are corrected automatically to allow for changes in line spacing, whether headers or footers are on. The figure on the status lines is always the true line number as it will be printed.

Reference is made to the fact that the Undelete command can be used to mimic a block move. This might give the impression that Protext does not support block moves, when in fact it has very simple commands to move, copy and delete, as well as undelete, blocks of text.

Reference is made to the fact that mail merging can result in a lot of wasted paper if you make a mistake. The manual mentions that the PRINTS command (to print to screen) is particularly useful for checking that a mail merge file is correctly arranged, before you commit it to paper.

PRINTS is a very useful option at any time, as it gives a good indication of how any document will appear on the paper.

From personal experience, I would doubt the validity of the statement that Protext's spell is slower than LocoSpell if you are to compare their use in similar situations. Perhaps if you were to compare the stand alone version of Prospell, where you have to save the file, leave Locoscript, load Prospell and then carry out the spelling check, there may be some validity in the statement, but Protext's Spell enables you to check a document in memory very much more quickly.

While I can see the point about being able to check a single word with LocoSpell, in many ways this defeats the object of a spelling checker, which is not only to check for incorrectly spelt words, but also for typing errors, which can only be done by checking through the whole document.

I do not see the inability to read Locoscript files directly to be a major failing, as normally, once a document is completed, it is merely archived for possible future reference. One would therefore only bother to transfer those Locoscript documents which you needed to use again, which can easily be done via the Make Ascii option and then can simply be loaded into Protext and reformatted as a normal Protext document.

Control codes and any other codes, such as soft hyphens, may be hidden at any time by use of the ALT-V V command.

Handling disc, loading and saving operations from command mode, rather than from a LocoScript menu is actually far quicker, as it allows multiple operations to be carried out. For example, to copy all .DOC files from one drive to another simply requires the command COPY a:*.DOC B, rather than having to select each one individually and then confirm it.

One particular use for the typewriter mode is as a quick and easy way to add individual postscripts to letters after the main part has been printed.

I hope you will find the above information useful

David Foster,
Cumbria.

LD: *The real test is yet to come. Protext vs LocoScript 2. I spoke to Locomotive about the speed tests they ran on Prospell and they sounded very fair, but I doubt there is that much in it.*

Looking up Great Aunt Ethel

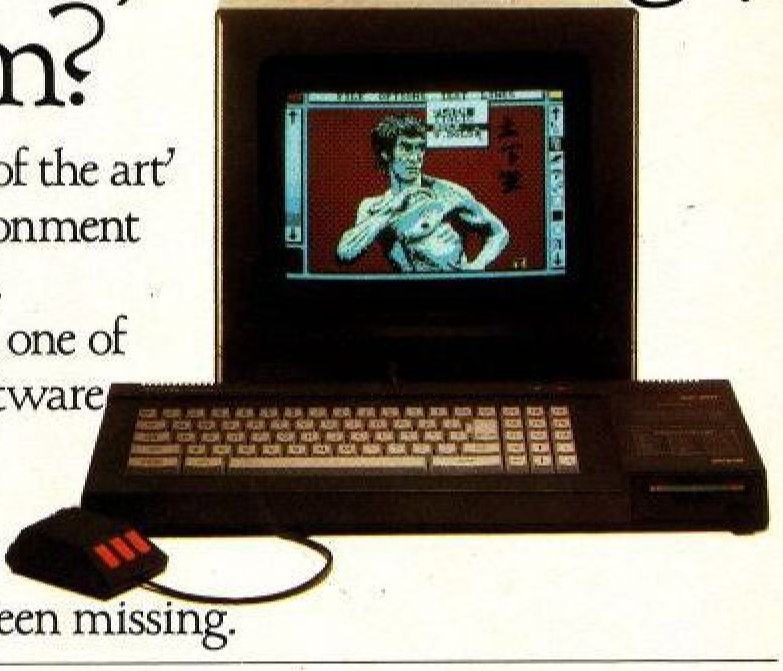
In the February edition of *ACU* you published a letter from G.K. Armstrong who had written a data filing system for his genealogical records. I am also in the process of researching my family history and would welcome a contact from anyone who could provide such a program.

S. Rowden,
16 Howard Gardens,
Guildford,
Surrey,
GU1 2NX

Worthy cause

I am currently researching any project that are using computers with severely handicapped people with a view to starting a project in East Sussex. I would be grateful if you would publish

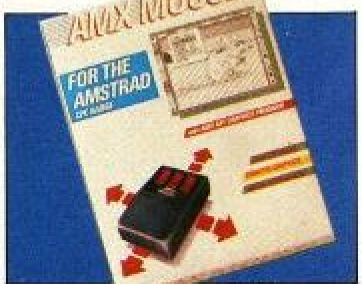
What's so special about the Mac, the Atari St, the Amiga, Windows and Gem?



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The AMX Mouse and compatible software – it's what you and your AMSTRAD micro have been missing.

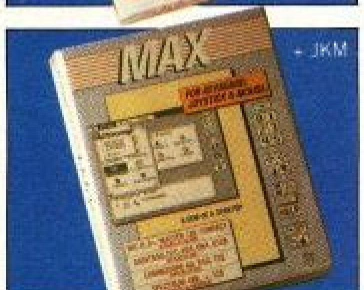


ART AND MOUSE OPERATING SYSTEM

AMX MOUSE PACKAGE Tape and 3" Disc — £69.95

There's not much joy in a joystick and keyboards can be all fingers and thumbs. Acclaimed by the press as 'the best input device', already over 50,000 micro users have adopted an AMX Mouse. The Mouse comes with fantastic Art Software and AMX control which enables you to create a Mouse environment in your own programs. Available for Amstrad CPC 464, 664, 6128.

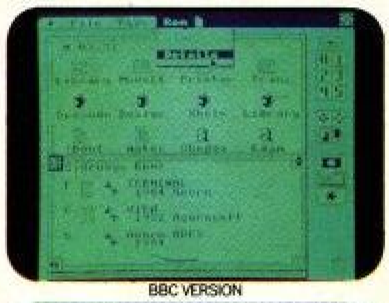




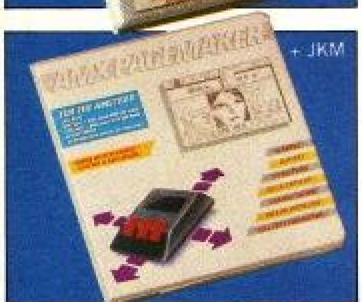
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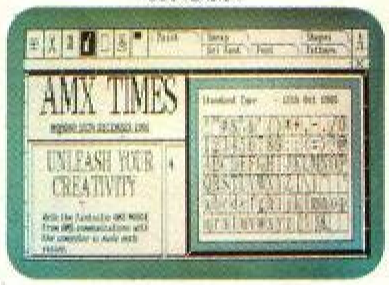
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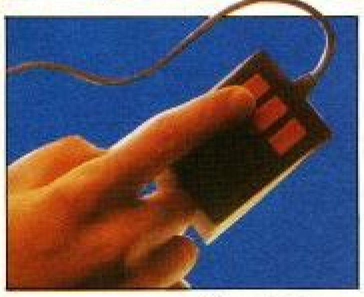
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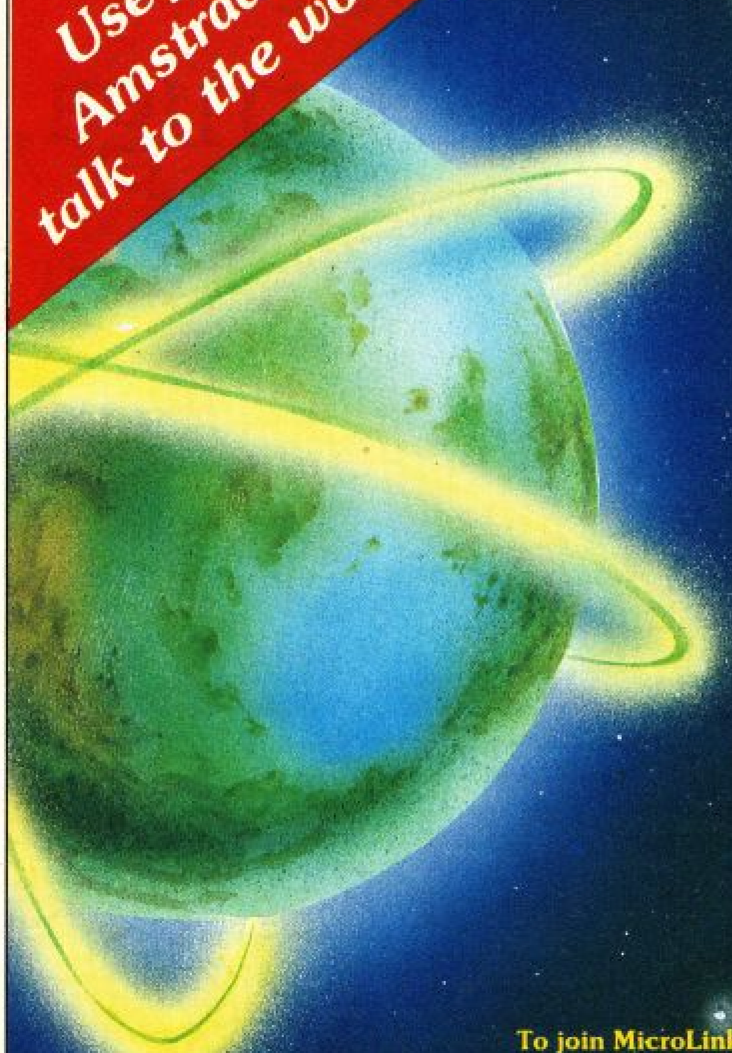
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ACU5

this letter in case any of your readers have experiences they would like to pass on to me. The aim of the project in Brighton would be to investigate whether computers can be used as a tool to facilitate communication, possibly as a very low level, with mentally handicapped adults who otherwise have no communication at the present time. In particular I am interested in any programs geared towards adults rather than children and in your readers experiences and the hardware they use.

Mark Tennent,
Social Worker,
Hollingdean & Coldean Office,
62 Brentwood Rd,
Brighton,
East Sussex.

Listing lament

AHGGRR! The DUSJL (Dreaded Un-Standard Jump from line 30 to line 75 in Listing) has struck once more. I refer to the line numbering system in the April issue of *ACU*. Instead of, like most other ordinary minded humans, numbering their program lines in steps of 10, 1 or 5 or so on, they chose to confuse all us proggy-enterers and use oddly numbered lines. Please could you RENUM listings.

Excellent April Fools Day trick! After seeing no immediate clues to the presence of a trick, I started to read the article entitled Amstrad's Going into Orbit and I honestly believed it.

When I read that the main rocket consisted of three Aprils I became very suspicious. I finally knew that I'd been fiendishly tricked when I saw that the satellite would be called the AF-1!

Jason Anderson,
Portmead,
Swansea.

LD: *There was a lot wrong with Quoite – if you send me a stamped addressed envelope I'll let you have a corrected (and renumbered) listing. Thanks for the April Fools compliment; the thanks should go to Rupert, Vax and lunchtime lubrication.*

Postal programs

With reference to the enquiry in the letters section of the last issue, from Mr. Johns of Dorset concerning the use of the CPC6128 in sub post offices, we supply Sub Office Software, a suite of programs currently in use from Aberdeen to Penzance which process daily Post Office transactions and weekly balance.

If you can put us in touch with Mr. Johns, we can let him know of the post offices in this area which are already running the system.

C.E.Cope,
Geotechnical Monitoring,
Birmingham.



Locked away

I am writing to you at this moment in deep agony over a small and seemingly easy problem. How do I use my extra 64K? Ever since I got my 6128 computer it has been pure agony for me as I slave away compacting when I know that locked away deep inside my computer there is an extra 64K. How do I use it? Bank Manager will do the job but it has many limits and boundaries. Recently in my attempts I ventured into machine code in the hope of a solution but to no result.

So here I am, writing to you on my hands and knees begging that you will end my agony and show me how to use my extra memory without using Bank Manager.

Simon Nursey,
Essex.

LD: *The extra bank of ram is tricky to access, that's why Amstrad supply Bank Manager. You will have to use machine code to do it yourself and I suggest you get a copy of SOFT 968 – the technical firmware manual but you may find it heavy going. DK Tronics sell a Rom which turns the extra ram into a silicon disc. This may solve your problems.*

More tape troubles

I own an Amstrad CPC464 with a disc drive. Recently, my tape deck gave out completely due to rather heavy use and much rough treatment. The majority of my games and utility software is on tape because disc space is so expensive, and as a result I am left with a pretty useless machine on my desk.

I have tried returning it for repair,

but the warranty has run out, the machine has been tampered with (oops!) and the quote I received was £30 for several months wait.

I have tried wiring in an external tape deck but I am unsure which wires I should disconnect and plug the external wires into. The wires directly beneath the built in deck are red, black, white, blue, green, brown, grey, and yellow from top to bottom.

I have tried to replace these wires at random, but alas, no success.

I have therefore written to you with an urgent plea for information and meanwhile I have to sit staring at my machine with its entire library of CP/M, DR Logo, and Roland in Space, with 80 other games and utilities on tape. Arghh!

Michael Fin,
Chiswick.

LD: *You really should get your tape deck fixed, there is no excuse for a long wait, since it is a fairly routine job. I'd have thought that £30 was a little steep but not amazingly so.*

The leads you need to worry about are the blue and green. Blue is for data in (load) and green for data out (save). Now that blank discs are so much cheaper, the price of disc-based games ought to come down.

Foul play

A while ago I purchased a game titled The Boss by Peaksoft for £8.95. Although it was never a biggie game, for some reason I bought it. Earlier this year I bought Soccer Boss by Alternative Software for £1.95 at a nearby computer shop thinking that might be better.

To my amazement and anger Soccer Boss seemed exactly the same as The Boss so I thought "Hmmm, something not quite right here" (but in a stronger, foreign language). Is this just an unlucky coincidence or have I been cheated of £7? Is this sort of copying legal?

Martin Fancourt,
Up-minster,
Essex.

LD: *Repackaging football games does seem to be a bad habit among software companies. Even Virgin is at it with Soccer '86 being updated to Soccer '87. I'm not sure what went on between Peaksoft and Alternative Software but thanks for warning all* ACU *readers.*

Called to the bar

Had a *CPC464* for Christmas, great. Bought *ACU*, great. Decided to type in K. Freeman's program 'Combat'. Took ages, run, error line 200, |SPRITE! What's |SPRITE?

Don't know, fetch Dad, now Dad was found long ago among a row of turnips, error, error, delete turnip.

Have re-checked Type In error. Now line 1490. Can anyone tell me what went wrong?

Kirk Guest,
Birmingham.

LD: *The bar command signifies an RSX. Look at the keyboard, find the symbol. This shares a key together with @ and the world is your RSX.*

Prestel proggies

I have a CPC464, a modem and am registered with Prestel. I want to do some of this downloading of programs I hear so much about. How do I go about it?

Kenneth Allen,
Warlingham

LD: *Amsnet and Micronet offer tele-software for the CPC's but you need the right software to get at it. Amstrad, KDS and Pace have software which will work, but the Cirkit interface software was written before the standard had been established. You need to be a member of Prestel Microcomputing to get to the important pages. It's fun, so have a look.*

Programming Mousterpiece

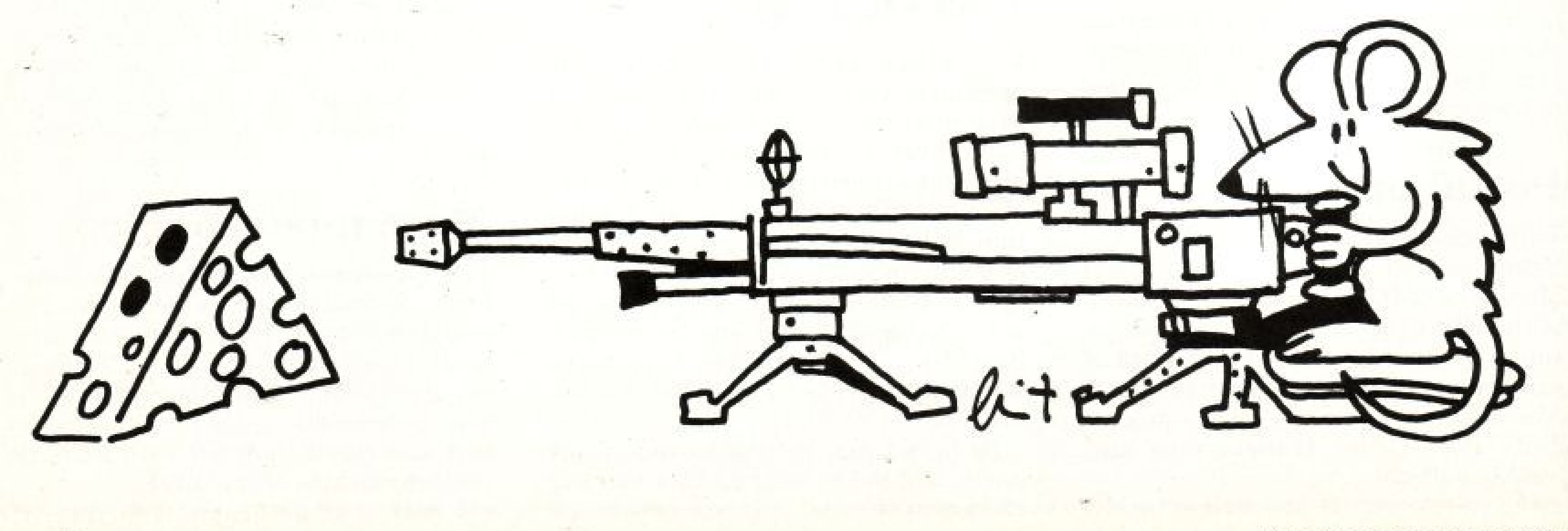
A little help for any fellow AMX mouse owners who have painstakingly typed in the game Sniper in February's *ACU* and have found the cursor key control clumsy and difficult to handle (like I did), which enables a mouse to be used to move the gun sights.

An extra feature, HOLD: by pressing <EXECUTE> the game freezes until <CANCEL> is pressed, is included – free of charge.

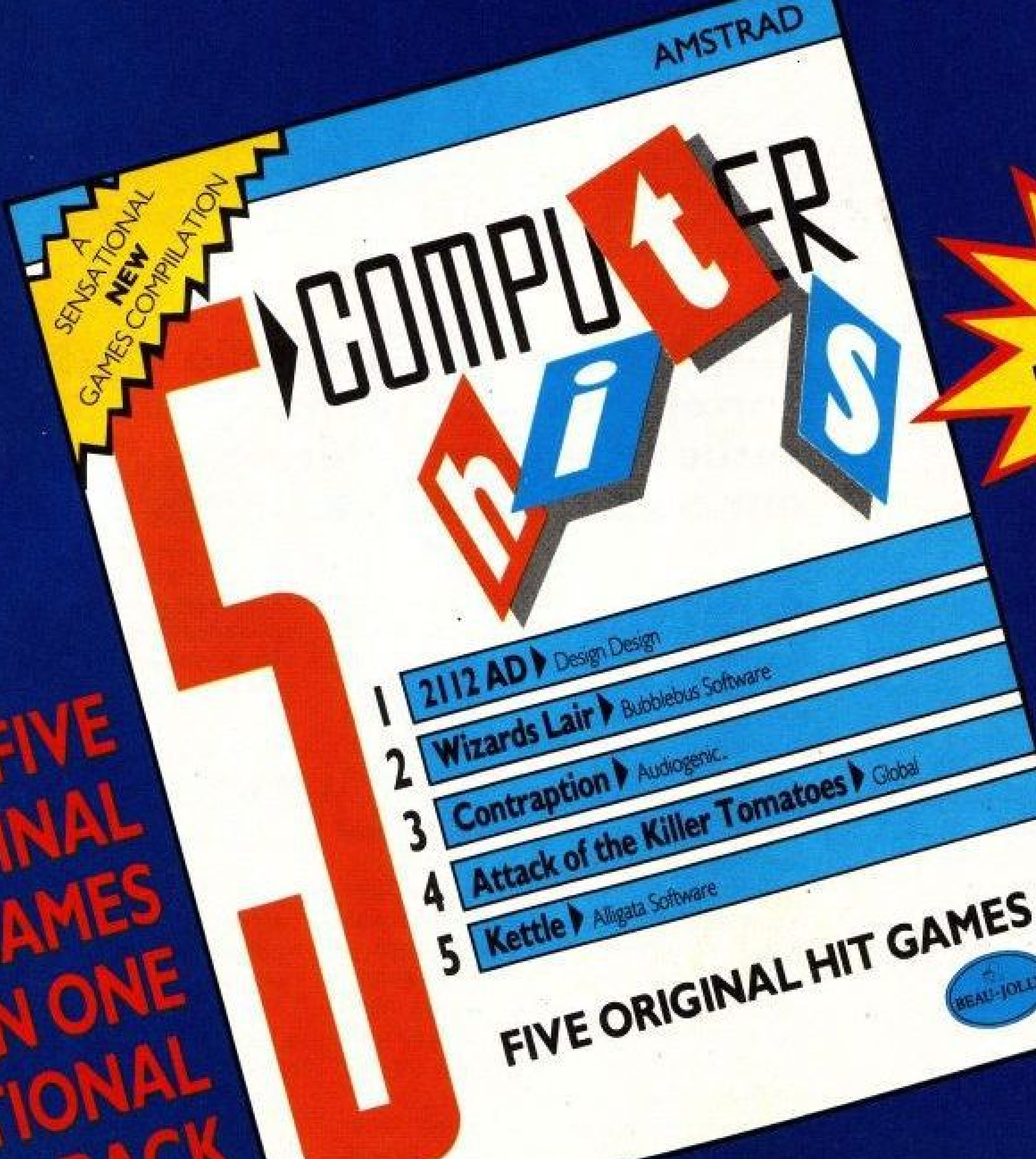
All that is necessary is to modify some lines as shown below. The remainder of the program should be left as it is. When the game is run the mouse files DEMLOA.BIN, DEMO.RS, VDUTAB.O, and ROM.ICN should all be on the same disc (or same tape – in that order), as these will load automatically.

David Clark, Doncaster.

```
40 PRINT"Please wait"
50 SYMBOL AFTER 32:MEMORY &5FFF
60 LOAD"!demloa.bin",&6000:CALL &6000:CLOSEIN:GOSUB 970
70 |MOUSE, 1:BORDER 3:MODE 0:SOUND 4,300,10,10
80 DEFINT a-z
.....
etc
.....
560 'keyPress
570 IF INKEY(78)=0 AND sh>0 THEN GOSUB 760
y
590 x=x/8:y=50-(y/8)
600 x=x mod 40:y=y mod 24
610IF INKEY(77)=0 THEN WHILE INKEY(76)<>0:WEND
620 IF x=a AND b=y THEN 650
.....
etc
```



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Advanced Art Studio

The Advanced Art Studio aims to correct the shortcomings of the earlier Rainbird offering. Jill Lawson, our own digital Dali, takes a peek.

Rainbird's original OCP Art Studio became available for CPC 6128 possessors in the latter part of 1986. Incorporating many sophisticated features, it provided excellent value for money (*ACU* November 1986). Now Rainbird has come up with Advanced Art Studio, which offers all the capabilities of the original version, plus many new and exciting characteristics.

The screen layout is the same, with a double row of drop-down menu boxes. Selection is via the cursor keys and spacebar, but there is an option to define one's own choice of keys, use a joystick or mouse. The program comes with an extensive manual, but the majority of available functions are self-explanatory.

Duplicate dump

No alterations have been made to the printer dump section, and the file handling is similar, but now screens can be compressed when saved, allowing several more pictures to a disc.

As before, patterns and text files can be saved or loaded with similar files accessed via the appropriate menu, and an innovation is the ability to save and compress individual windows.

Colour palette selection is one of the areas where some of the most radical changes have taken place. As one would expect, two inks may be selected in Mode 2, four in Mode 1, and 16 in Mode 0, which is newly supported in this Advanced version.

Now, however, there are 12 vertical scroll bars associated with every ink.

Each bar may be set to any one of the Amstrad's 27 colours, so that an ink may sequence through a maximum of 12 different colours at a speed determined by an indicator on a horizontal bar near the top of the screen. The colour of the border may be set in a similar fashion.

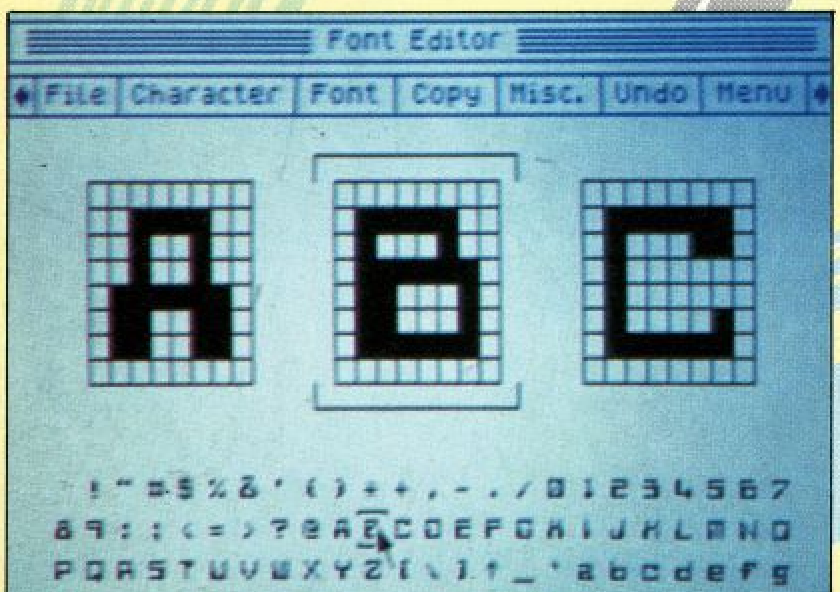
Colour choices may be further manipulated with the cycle and rotate switches, allowing an infinite variety of animated palette effects.

Under the paint heading the choice of 16 pens remains the same, as do the spray sizes, but now spray can be fast, giving a thin distribution of dots, medium, or slow – which gives the densest coverage.

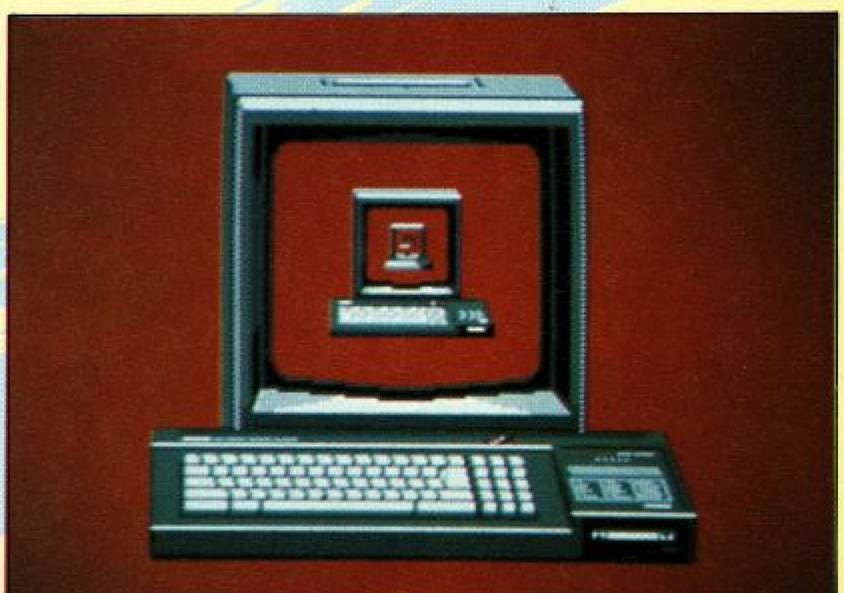
The brush option is quite different to that in original Art Studio. The brush patterns and the textured fill patterns are linked, with a single pattern element available as a brush, or multiple elements "tessellated" to form a fill texture.

A total of 15 new patterns may be designed at any one time, but frequently-used textures, such as stipple fills could be saved as separate files and re-loaded as necessary.

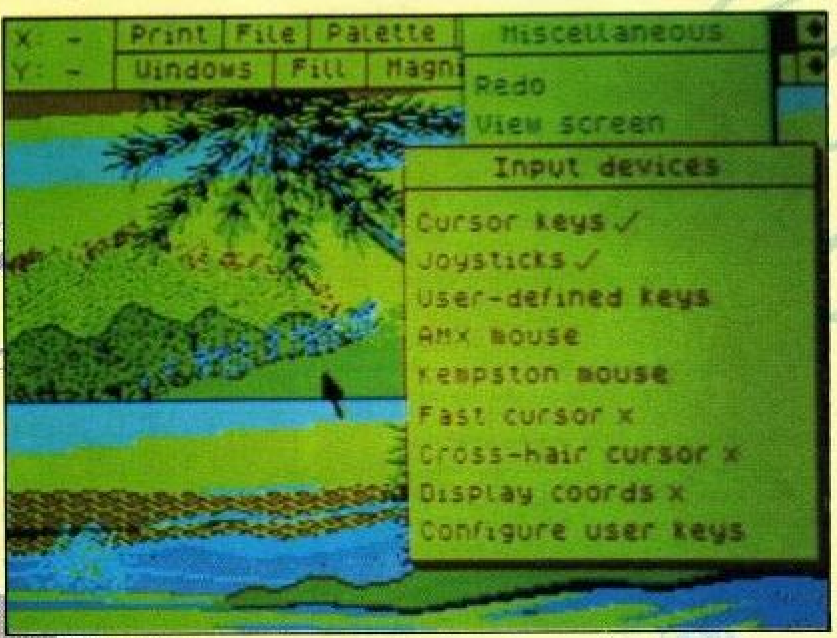
A pattern element (brush) is designed on a grid of height and width variable between one and 16 pixels.



The font editor is easy to use



One computer inside another, inside another, inside ...



Flexible entry



Mode 1 still produces best results

Multi-coloured mixtures are possible, backgrounds can be transparent, and an existing design can be copied to another pattern box, flipped, rotated and scrolled. In addition, an area of the picture can be captured and used as a pattern.

This is by far the most advanced and versatile system I have come across for pattern design, and is a delight to use.

The shapes menu has been extended to include ellipses. These and the circles can now be filled as well as unfilled, but this facility does not apply to rectangles or triangles.

As previously, one can choose an elastic preview for lines and shapes. It is perhaps surprising that this is not the default choice, and I would have appreciated an on-screen reminder of the current foreground colour when in drawing mode.

Extra extras

Along with the new screen mode 0 there are two significant extras in the miscellaneous section. Firstly redo, which complements the undo function by allowing a preview of what will be undone.

Although this is a valuable plus, I would have preferred a change to the undo, which, unlike other utilities, does not just remove what was drawn in the immediately previous operation, that is the last line or last area filled, but takes out everything back to the last drawing mode selection.

Consequently a small error in drawing a single line could result in a loss of a great deal of correctly drawn picture if it has all been produced since the last pen change, or, more seriously, a leak in a final fill could neccessitate a restart to filling a number of separate areas. It is necessary to reselect the same mode frequently to avoid frustration of this kind.

The second item is the very useful ability to protect inks. Basically, this means that anything drawn in a "protected" ink is not obscured when drawing over it in a different colour. So scenery, for instance, can be drawn behind an object in the foreground so long as care is taken to do it in a colour not used in the object.

Ink protection can apply to all drawing on screen, whatever the function, but it should be remembered that a protected ink does not constitute a boundary when performing a fill. Used with care, this is an extension which could prove invaluable.

Layout of the windows menu has been revised, but only the abilty to save and reload windows is new.

I believe that the finished version will be changed so that the current drawing ink will automatically become the current plot colour in the zoom modes.

Addition of text in a choice of sizes, styles and directions, with a choice of several fonts and an editor to allow creation of new fonts, now lets one change the spacing within a range of 4 to 15 pixels.

Conclusion

In the space of only a few months this version of Art Studio succeeds in making the original "best buy for the CPC 6128" art studio look old-fashioned and out-dated.

It is an absolute must for any aspiring artist, either as a stand-alone utility or as an excellent add-on to your favourite existing drawing program, because of the ease with which one can now swap pictures between studio and other utilities simply by saving or loading with an appropriate file name.

If you own a CPC 6128 buy it. If you don't, buy a 6128! ACU





The three magnify levels remain excellent

GALLUP SOFTWARE CHART

		Title / Publisher	Comment	Last month	Market strength
1	Up	**Ninja** *Mastertronic*	The fist fiends fight on, this time with a more vicious trait and at a lower price. You have to fight off the many using a variety of weapons. A bit like Kung Fu Master.	11	100
2	Up	**Konami's Coin Op Hits** *Imagine*	Save all your pennies for some day by avoiding the arcade and playing Green Beret, Ping-Pong, Hyper-sports, Mike and Yie Ar Kung-Fu at home.	3	93
3	Down	**Gauntlet** *US Gold*	Excellent conversion of the multi-player arcade smash. Impressive use of the 16 colour mode and high speed animation.	1	87
4	Down	**180** *Mastertronic*	Digital darts, a budget game based on the non-intoxicating bar-room skill.	2	70
5	New entry	**Feud** *Bulldog*	The first game on the new Mastertronic label. Chunky sprites and a mystic plot go to make up this 2D maze game.	ne	61
6	Down	**Computer Hits 10 Vol. 3** *Beau Jolly*	All your fave raves on one tape. A bargain compilation from the various artists of the computer industry.	4	59
7	Down	**Five-a-Side Soccer** *Mastertronic*	Football games have been around since the days of Pong, now a cheapie for the CPC keeps the trend alive.	5	50
8	Down	**Five Star Games** *Beau-Jolly*	Good bargain compilation as seen on TV. Ideal first buy for the new computer user. Worth £9.95 for Spindizzy alone.	7	49
9	New entry	**Ghost Hunters** *Code Masters*	This game is absolutely nothing to do with Ghostbusters, it isn't trying to cash in on the name but it is sold at budget prices.	ne	48
10	Up	**Mini Office II** *Database*	A full suite of business software at a low, low price. Ideal first look at sensible software but lacks the power for major applications.	17	46
11	Down	**Hit Pack** *Elite*	Compilation of games for the price of one, oldies but goldies, still with a plethora of compilations you can pick and choose.	6	44
12	Up	**Footballer of the Year** *Gremlin Graphics*	Deep thought is needed in the football futures game from Gremlin. Has the added bonus of good graphics.	18	43
13	Down	**Donkey Kong** *Ocean*	One from the vaults. Save your girl from a gorilla in the game which was the arcade hit of yesteryear. Odd actually, a Kong game for the 64 was one of Oceans early titles.	6	42
14	Down	**Trivial Pursuit** *Domark*	Quirky questions and polished presentation give you as many endless hours of fun as the board game. Also available for the PC and PCW.	9	41
15	Down	**Space Harrier** *Elite*	Ace Amstrad version of the Sega arcade buster. When the real thing costs up to 50p a throw this game looks super cheap but plays like nothing you've seen.	8	41
16	New entry	**Short Circuit** *Ocean*	Let number five come alive in your Arnold. A pretty 3D maze adventure with a mission to seek out and be cute. Based on the film of the same name.	ne	39
17	Up	**Ikari Warriors** *Elite*	Excellent conversion of the coin-op game. Commando style for two players. Excellent graphics and great fun.	re	39
18	New entry	**Riding the Rapids** *Players*	Aquatic sports simulation at a low price, guide your canoe through gates and boulders. Mediocre Mode 0 sprites. Requires a supple wrist.	ne	37
19	Up	**Dragons Lair** *Software Projects*	Atari Laser disc classic. Just as challenging if not quite as pretty on the Amstrad. Large sprites well animated. Part II now available.	re	36
20	Down	**They Sold A Million (3)** *Hit Squad*	Fighter Pilot, Kung Fu Master, Rambo and Ghostbusters go to make up this compilation of past classics.	16	35

Non-mover — Up — Down — New entry

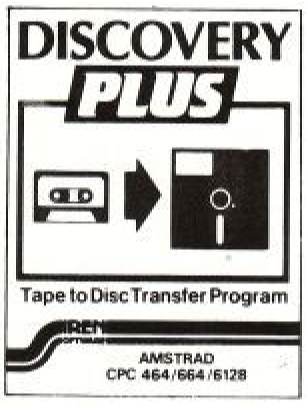
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"Each section is fully documented with clear and precise instructions" Amtix! June 86

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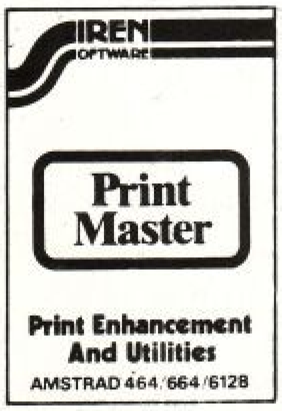
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HAIRY HACKERS HAUNT



Hairy Hacker coding bright
In the darkness of the night
As thou peer deep to see
Magic pokes in disassembly

First off, thanks to Madame Cyn for throwing that really great party on the Ed's birthday last month. He loved the cake, but the girl didn't like it when he bit into her.

Last month: Sell-by soup. This month, sniff-by soup. This is really last month's sell-by soup that's getting a bit dubious.

Some of the soup has developed quite well, biologically speaking. We wondered if it might have developed any form of intelligence yet, so we devised a test for the intelligence of soup. It's called: The Tureen Test.

Straight in then, with a very silly one from Steve Clarke of Ipswich. He has noticed that if you hold down Caps Lock, Up Cursor, f2,f5,f7 and f8 while playing Thrust, your score increases at about 40,000 points a minute. This also boosts your lives up to about 20 after five minutes with your fingers spreadeagled over the keyboard, like some evangelist laying on hands.

Now a brief interval, during which Justin will play the West Bank Infinite Lives concerto with a major checksum.

Rewind, run and enjoy:

```
10 MODE 1:MEMORY &1FFF
20 LOAD "",&2000
30 tot=0
40 FOR n=&BE00 TO &BE20
50 READ a$:a=VAL("&"+a$)
60 POKE n,a:tot=tot+a
70 NEXT n
80 IF tot<>2693 THEN PRINT"summing wrong
   with that there data.":END
90 CALL &BE00
100 DATA 21,00,20,11,00,01,01,00
110 DATA 02,ed,b0,21,19,be,3e,c3
120 DATA 32,82,01,22,83,01,c3,00
130 DATA 01,af,32,dd,92,c3,8c,91
140 DATA 4a
```

A Mrs. April Rigby, no fooling, has writted in (in a recycled Visa envelope) asking for Fairlight pokes; for a Joyce.

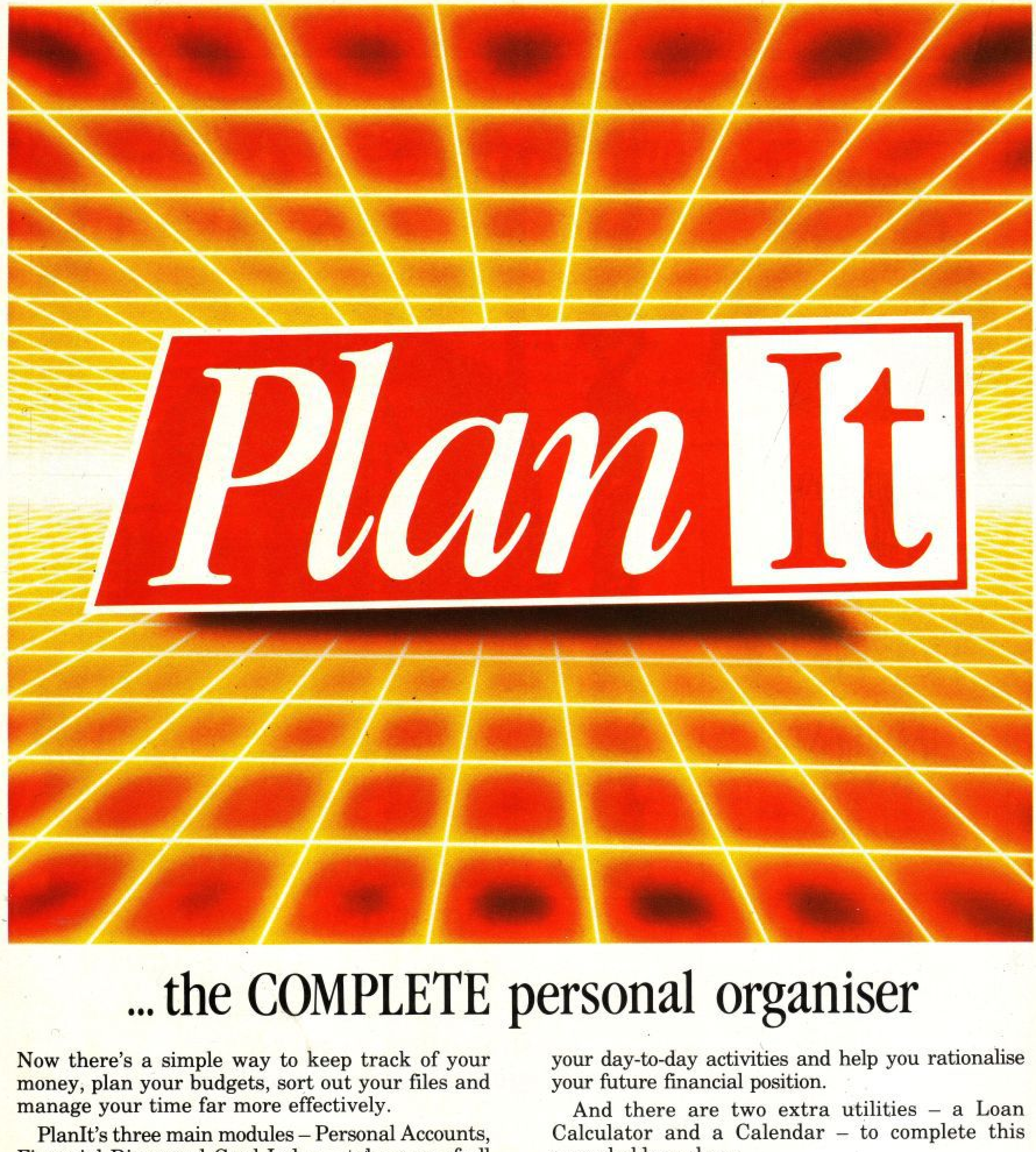
Well, when you have a device called a Z80 emulator, pokes are easy to find and just as easy to get in.

Unfortunately, putting pokes into Joyce games is a bit tricky at your end. If anyone beats me to the Fairlight Joyce hack, it should be worth Hack of the Month . . .

Speaking of which, we have a letter here from a certain El Hosko, postmarked in Germany and with a return address in Berkshire. Are you trying to confuse me or what? No matter, the letter contains two pokeyettes which might interest you.

One is for Heartland (which I haven't got and can't test), the other is for Gauntlet. Yes I know we've had Gauntlet before, but this one's different.

So, here's the poke for the disc ver-



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ACUP5

sion of Heartland:

```
10 MEMORY &1FFF:LOAD "kim",&2990
20 INPUT "Infinite energy (y/n)";a$:IF U
   PPER$(a$)="Y" THEN POKE
&4FEE,&FF
30 INPUT "Infinite time (y/n)";a$:IF UPP
   ER$(a$)="Y" THEN POKE
&2CE5,0:POKE &2CE6,0:POKE &2CE7,0
50 CALL &2990
```

Run that, and I am assured that the accompanying maps will almost guarantee success.

Not only but also, we have pokettes for the fabled Gauntlet. This poke will run the game (running the Gauntlet?), but with options to dissable generators, freeze the monsters and the time, and – of course – infinite lives.

Type in the listing below (kindly retyped by the Wife), save it on a different disc (Gauntlet gets unhappy when you save things on it) and run. Put the real Gauntlet disc in when it asks for it, or you won't get too far.

```
10 MEMORY &20FF
20 FOR i=41000 TO 41041:READ a:POKE i,a:
   NEXT
30 DATA
&21,&4e,&a0,&cd,&d4,&bc,&22,&4f,&a0,&79
,&32,&51,&a0,&1e,&00,&16,&00,&0
e,&41
40 DATA
&21,&00,&31,&df,&4f,&a0,&1e,&00,&16,&00
,&0e,&42,&21,&00,&33,&df,&4f,&a
0,&c9,&84,&0,&0,&0
50 PRINT"Insert "+CHR$(24)+"GAUNTLET"+CH
   R$(24)+" disc & press
enter":WHILE INKEY$="":WEND
60 CALL &A028
70 FOR i=&30F2 TO &30FF:READ a:POKE i,a:
   NEXT
80 DATA &21,&00,&31,&11,&00,&01,&01,&40,
   &02,&ed,&b0,&c3,&00,&01
90 add=&32D0:POKE add,&AF:POKE &319E,&D0
   :POKE &319F,&2
100 INPUT"Disable generators [Y/N]";b$
110 IF (b$="Y") OR (b$="y") THEN FOR i=1
     TO 8:add=add+1:READ a:POKE
add,a:NEXT
120 DATA &21,&3a,&85,&77,&23,&77,&23,&77
130 INPUT"Freeze monsters [Y/N]";b$
140 IF (b$="Y") OR (b$="y") THEN FOR i=1
     TO 8:add=add+1:READ a:POKE
add,a:NEXT
150 DATA &21,&bf,&a3,&77,&23,&77,&23,&77
160 INPUT"Freeze time [Y/N]";b$
170 IF (b$="Y") OR (b$="y") THEN FOR i=1
     TO 16:add=add+1:READ a:POKE
add,a:NEXT
180 DATA
&21,&f5,&99,&77,&23,&77,&23,&77,&21,&05
,&9a,&77,&23,&77,&23,&77
190 POKE add+1,&C3:POKE add+2,&0:POKE ad
    d+3,&84
200 CALL &30F2
```

For his extreme persistence, loyalty, courage, impertinence and so on, El Hosko gets (tatatadaaaa) the coveted Poke of the Month Award. Just let me know what your favourite games are, and we'll try to get you one of them, OK Hosko?

Now for making impossiball possiball to anyone, here's another Justin special. Windo forwardo past la firsto fileo sed runo la routineo.

```
10 MODE 1:MEMORY &13FF
20 LOAD "!",&8000:CALL &8000
30 LOAD "!",&1400
40 LOAD "!",&C000
50 POKE &9631,0:POKE &9632,0
60 POKE &963A,0:POKE &963B,0
70 POKE &96A3,&18
80 POKE &A462,0
90 POKE &A465,0:POKE &A466,0
100 CALL &8200
```

Who sent me two sheets of blank paper?

While everyone fails to admit it, have another one from Justin's selected finest pokes box. This one's for escalating prospects in Elevator Action:

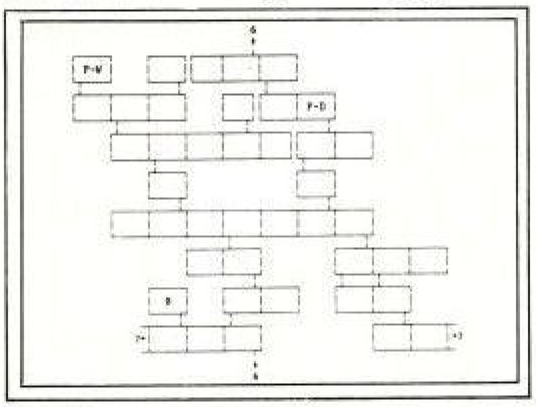
Wind forward past the first file.

```
10 MODE 0:OPENOUT "d":MEMORY &FFF
20 BORDER 0:FOR p=0 TO 14:READ a:INK p,a
   :NEXT
30 LOAD "!scn",&C000
40 LOAD "!act"
50 POKE &148E,0:POKE &148F,0
60 POKE &1490,0:POKE &1493,0
70 CALL &59A2
80 DATA 0,26,14,13,24,6,2,9,3,16,1,10,18
   ,0,7
```

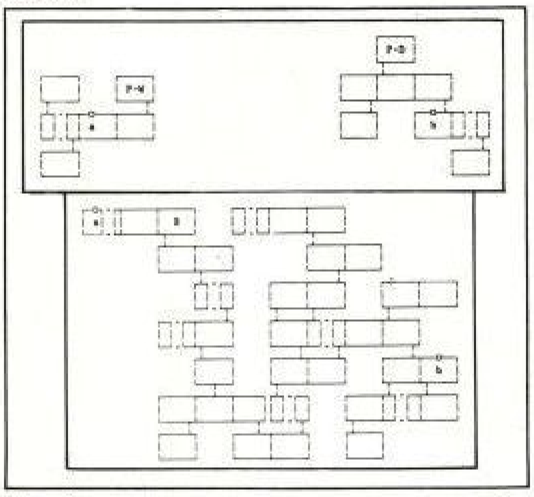
You're probably still waiting for Cliff's infamous map editor and stuff for Street Machine, aren't you ? Well, waiting time is over. After much sweating over a hot keyboard (thank God for sealed switches), here it is.

First type ye famouse listing. Remember that the artwork department has been known to mis-label stuffs, so see which one looks right. Stick in a blank tape/disc, and save the program. If you don't save it, you'll have to type it in every time. Great typing practise, but lousy gameplay.

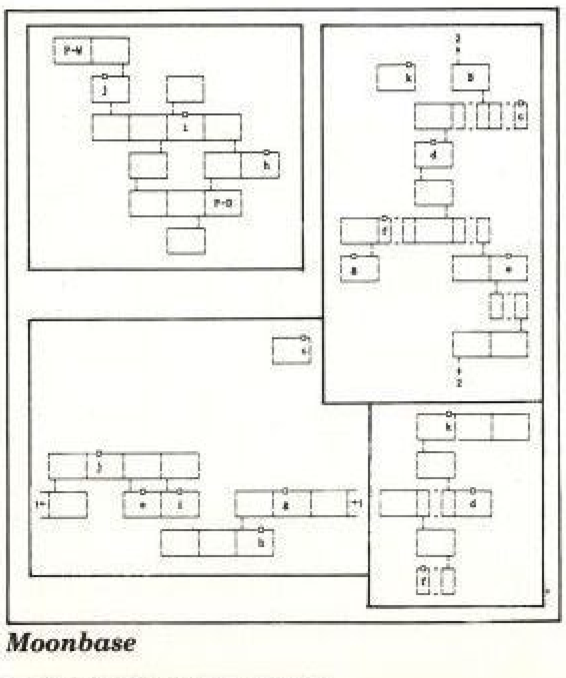
If all goes well (unlikely), you'll get a message suggesting that now is probably a very good time to put in your real Street Machine tape and press play and so on. The proggy doesn't load



Castle



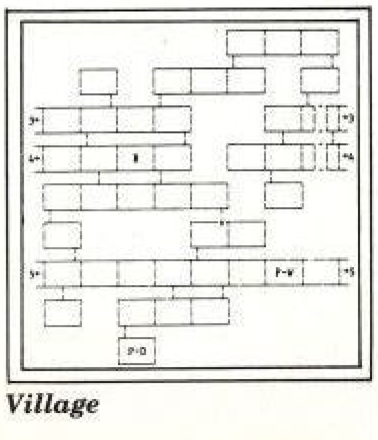
Garden



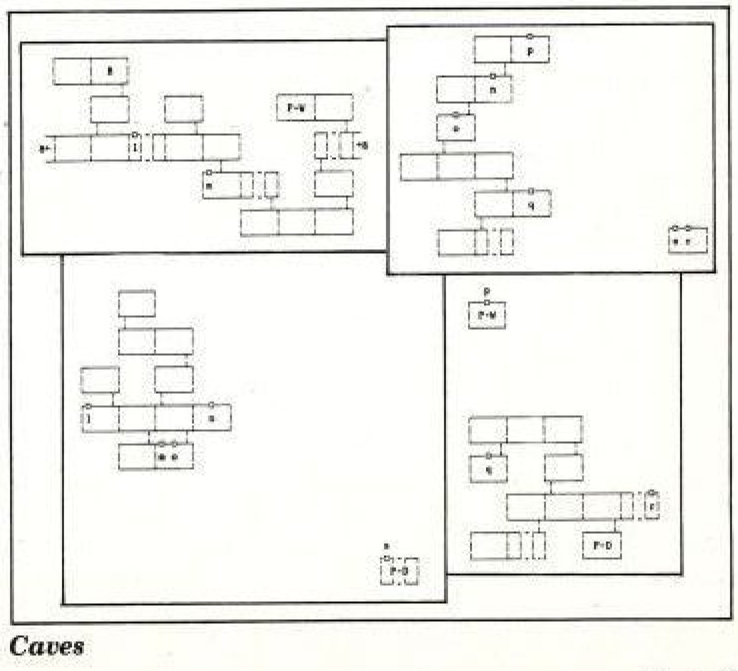
Moonbase

KEY

B .... bed
P-W .... page – white
P-D .... page – dark
□(a-s)......... lifts
↑ ↓ (1-8).... connections



Village



Caves

```
10 REM ** Cliff "One pop, two pushes" Lawsons
20 REM ** famous Street Machine poke, slightly
30 REM ** polluted by the "Small furry
40 REM ** creature from the Crab nebula"
50 REM ** special loader.
60 REM **
100 MODE 1:LOCATE 1,23
110 loc=&8000:l=1000
120 READ a$,a:cs=0
130 IF a$="*" THEN 230
140 PRINT "Line ";l;CHR$(13);
150 IF LEN(a$)<>32 THEN 270
160 FOR j=1 TO 32 STEP 2
170 x=VAL("&"+MID$(a$,j,2)):cs=cs+x
180 POKE loc,x:loc=loc+1
190 NEXT
200 IF cs<>a THEN 270
210 cst=cst+cs:l=l+10
220 GOTO 120
230 IF cst<>66867 THEN 290
240 CALL &8000
250 PRINT "Type  TAPE and run again."
260 END
270 PRINT:PRINT"Check line for errors"
280 PRINT "and SAVE IT.":END
290 PRINT "I think you miss a line."
300 END
1000 DATA 21108011000C01FF03EDB0C3000C0000,1085
1010 DATA 210B0F06051100C0CD77BC210012CD83,1178
1020 DATA BCCD7ABC3EC9324F233EC932412D2127,1625
1030 DATA 0C22552AC30012F5E5D5C53E3ACD1EBB,1812
1040 DATA 280CAFCD0EBCCD5C0CCDEF0C18163E3C,1567
1050 DATA CD1EBB2805CD2B0E180A3E24CD1EBB28,1323
1060 DATA 03CD480EC1D1E1F1CD0DBDC9010000C5,1968
1070 DATA CDC80CCDD40CCDEABBC10321C044AFED,2373
1080 DATA 4220ECCD870CC9C5E101000011A000AF,1662
1090 DATA ED520330FB19C9212EFC119EC706143E,1640
1100 DATA C07712231310F83E40212DFCCDB80C3E,1566
1110 DATA 802142FCCDB80C2150FD1140C606503E,1673
1120 DATA C0771223131 0FAC9065277110008193 0,1155
1130 DATA 041150C01910F3C9217F38097ECDE60C,1576
1140 DATA CDDEBBC9CD770C2929EBC5E129E5C121,2386
1150 DATA 9001AFED42C921890E5F1600197EC921,1510
1160 DATA B02222070F22090FCD4B0DCD06BBFEFC,1521
1170 DATA CA0012FEF02818FEF12822FEF2282AFE,2179
1180 DATA F3282FFEF6CA010EFEF7CA160E18D92A,2069
1190 DATA 070F11A000AFED522209 0F18CB2A070F,1042
1200 DATA 11A0001922090F18BF2A070F2B22090F,640
1210 DATA 18B62A070F2322090F18AD2A070FE5C1,1046
1220 DATA CDC80CCDD40CCDEABB2A090F22070FE5,1823
1230 DATA 3E01CD59BCC1CDD40C3E0FCDDEBBCDEA,2297
1240 DATA BB3E00CD59BCCD7D0DCD5D0EC92A070F,1651
1250 DATA 2B2B017EC4CDB10D2A070F2B0182C4CD,1443
1260 DATA B10D2A070F0186C4CDB10D2A070F2301,1080
1270 DATA 8AC4CDB10D2A070F2323018EC4CDB10D,1597
1280 DATA C9117F381911C0FE193E05F57ECDC90D,1771
1290 DATA 11A00019F13D20F3C9FE7E38023E19E5,1734
00 DATA 6F26002929292929911407D19EBC5E1,1283
1310 DATA CDE70DE5C1E1C90610C506041A772313,1725
1320 DATA 10FA01FC07093005AF0150C009C110E9,1487
1330 DATA C92A070F22090F117F38197E3CFE7E20,1146
1340 DATA 01AF77C3F80C2A070F22090F117F3819,1097
1350 DATA 7EB720023E7E3D77C3F80C21100F0606,1242
1360 DATA 1100C0CD8CBC217F381120440100003E,1138
1370 DATA 02CD98BCCD8FBCC921100F06061100C0,1569
1380 DATA CD77BC217F38CD83BCCD7ABCC92A070F,2032
1390 DATA 117F38197ED60701A1C51E07CD750E3C,1364
1400 DATA 01D3C51E07D5F5C5CDC90DC121040009,1759
1410 DATA E5C1F13CD11D20EDC902010202020202,1444
1420 DATA 0202020C0C0C0C0808080C0C0C0C0808,142
1430 DATA 0808010106060 10C0C0C0C0101010 2,96
1440 DATA 0A020B04040B0B0B0B040C0101010102,97
1450 DATA 0101020101020103080809030102050 9,57
1460 DATA 070101 0F0F0F0F0D0D0D04040404040E,142
1470 DATA 0B040B05050505 0A0A08080A0A0A0C0C,136
1480 DATA 0A0C0C020C06060606010606080000 00,93
1490 DATA 00000005050000000000004D434F4445,370
1500 DATA 4E45574D415000000000000000000000,456
1510 DATA *,0
```

anything off the tape until the fourth program, called "MCODE". If you want to save a bit of time, scribble down the point at which this bit starts on an old fag packet, your filofax or whatever.

The game needs a buffer in which to put the data. Cliff used the screen, so don't worry about the technicolour effects inflicted upon the screen during loading.

When the game loads up and dumps the score table on the screen, you can start playing as normal, but you won't be troubled by minor breakdowns.

However, should you feel like redesigning the map to something approaching the complexity of spaghetti junction, press the E key. Before your very eyes, and anyone elses if they're watching, the whole shape of the map will be revealed. Eventually.

Also appearing on the screen is a small bright dot, which you will soon learn is capable of being moved about by the cursor keys. You've learned now, 'cos I just told you.

Anyways, once dot is learnedly moved to the right point on the map, you can scroll through all the pretty curves, hedges, cars, sheep and other possible shapes with the shifted left and right keys. Clever eh? Even cleverer is the provision whereby you return to the front screen with the Escape key.

All very well, I hear you say, but how do us mortals save the result to tape? Haha, you hear me answer, press the S key when in the front screen. It'll then save the map to tape.

If you don't want the messages all over the screen from the tape routine, add line 70 CALL &BC6B,1 . This is in fact one of those cunning uses of putting n parameters after a call to pass the number n to a subroutine.

OK, so you've saved your mega-tricky map. Now I suppose you want to load it in again later? How did I guess? Well, hit the L key while in the front screen and it'll start looking.

Sorry that the lives aren't infinite, but if you couldn't get to the menu you couldn't get to the screen designer, could you?

Ho hum, back to Just-a-poke. One I could do with here, infinite macho energy for ghost hunter. Got any Ego boosters Justin?

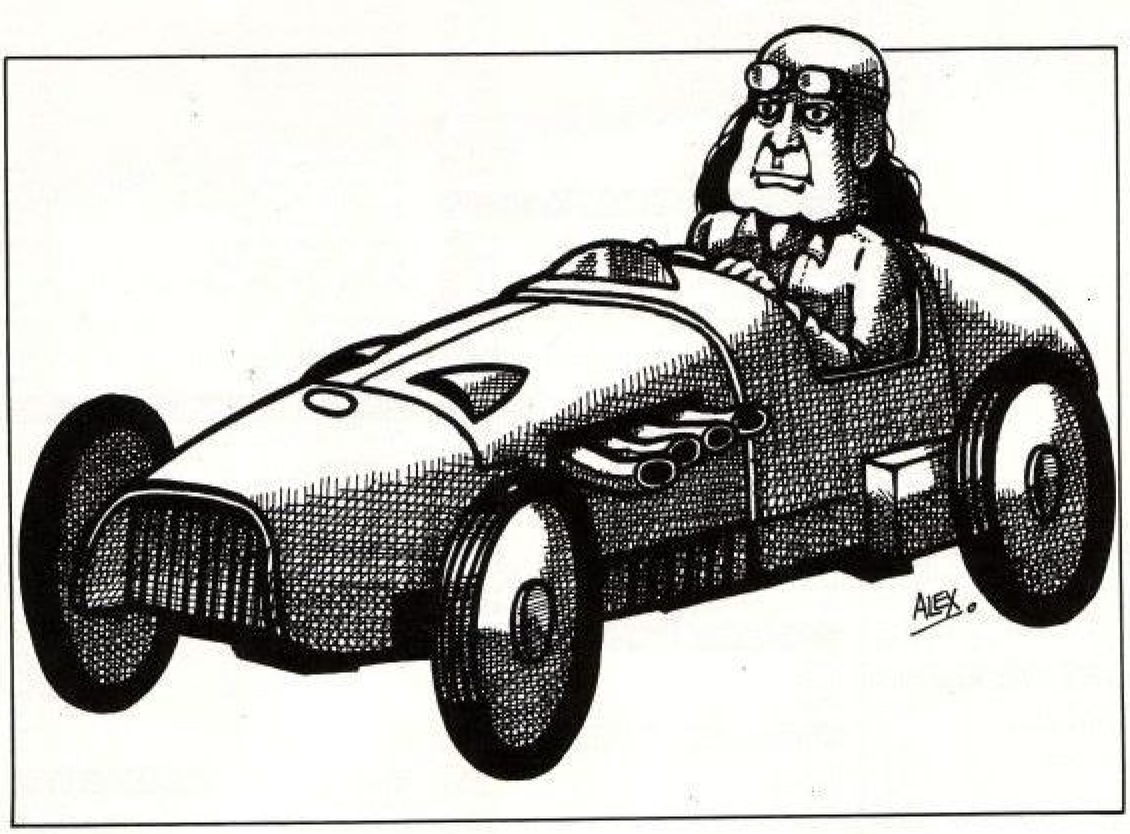
```
10 MODE 1:MEMORY 12345
20 LOAD ""
30 FOR n=&A4FC TO &A502
40 READ a$:POKE n,VAL("&"+a$)
50 NEXT n
60 CALL &A4A0
70 DATA af,32,c1,82,c3,73,61
```

Phrase of the month: As user-friendly as a cornered rat.

Next we have a few helpful tints and hips here for Dan Dare fans, courtesy of Alexis, Edward, and Martin of Sunderland:

- Don't go down a lift until you've blasted everything on a level as you can't go back up again.
- When you're getting the fourth bridging piece, or heading for the Mekon's rocket, don't shoot the things that look like telegraph poles. These block your path and you'll never win.
- Never try to duck or jump a Tree, although it's OK to do this with floor guns.


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● When you've just given Digby a bridging piece, never try to shoot the gun that moves up and down the edge. You'll be more likely to fall off.

Who knows, maybe you'll be able to do it without the pokes.

For those of you who use Borland's Turbo Pascal on the Airo, the following procedurette behaves much like the normal draw procedure in high res mode. The clever bit is that it lets you use all 16 colours available on the PC1512. It doesn't break any records for speed in the line-drawing stakes, but it works:

```
Procedure CDraw(x1,y1,x2,y2,c:integer);

const
   r_plane=$3de;
   w_plane=$3dd;

var r,w :integer;

begin
  r:=0 ; w:=1 ;
  repeat
  begin
   port[r_plane]:=r ; port[w_plane]:=w ;
   if (c AND w)=0 then
         Draw(x1,y1,x2,y2,0)
    else
         Draw(x1,y1,x2,y2,1);
  r:=succ(r) ; w:=w*2
  end;
  until w=16;
  port[r_plane]:=0 ; port[w_plane]:=15;
end;
```

I have been asked "Why does Turbo Pascal compile faster to disc than to memory?" Answer: it doesn't but if you've just compiled it in memory, compiling to disc just writes the bit in memory off.

C has been described as an encryption system for assembler. Arnor is bringing one out for the CPCs and Borland is about to release a version (aversion?) of it for the PC1512 soon. As soon as I get a copy, I'll rig graphics stuff for that too.

But enough, those of you not on *ACU* salaries will only have humble 464s, so here's infinite lives for that amazingly complex – and slightly familiar – Classic Muncher from Bubble Bus.

```
10 MODE 1:OPENOUT "d":MEMORY &4FF
20 LOAD "",&500
30 POKE 3561,0
40 POKE 3562,0
50 POKE 3563,0
60 POKE 3564,0
70 FOR n=&70 TO &7D
80 READ a$:POKE n,VAL("&"+a$)
90 NEXT n
100 DATA 21,00,05,11,00,01,01,00
110 DATA 94,ed,b0,c3,03,01
120 CALL &70
```

Now the Oz spot. Robbie Noordzy (alias: The Hopeless Hacker) has written in asking for a Ghosts 'n' Goblins pokeykin. Well, too late. It was in the September '86 issue (wasn't it ed?).

Remember, replies only come through the column, which doesn't cost me anything. I'm not in to sending letters to the land of Fosters, as this would be detremental to the Hairy Hacker's bank account (I get 50 per cent of the Ozzie mailbag). You keep on sending 'em to me, OK?

Now Justin time for a really snakey poke for infinite lives in Oceans Cobra:

(The quick may note that this routine is almost identical to that of Xevious.)

```
10 MODE 1:MEMORY 12345
20 LOAD ""
30 tot=0
40 FOR n=&A700 TO &A748
50 READ a$:a=VAL("&"+a$)
60 POKE n,a:tot=tot+a
70 NEXT n
80 IF tot<>7305 THEN PRINT"have a look a
   t the data, its wrong!":END
90 CALL &A734
100 DATA dd,21,00,bf,11,4f,00,cd
110 DATA 4e,bc,21,c3,1a,11,a7,af
120 DATA 22,1b,bf,ed,53,1d,bf,c3
130 DATA 00,bf,21,00,00,22,ca,4e
140 DATA 22,cc,4e,c3,00,41,3e,a8
150 DATA 21,67,fc,32,00,02,22,01
160 DATA 02,f3,f1,c9,3e,c3,21,26
170 DATA a7,32,e2,39,22,e3,39,21
180 DATA ff,ab,11,40,00,c3,af,39
190 DATA 4a
```

Two more left from Justin and I can go to sleep. So in rapid succession, here's infinite lives for Durrell's SIGMA 7:

```
10 MODE 0:OPENOUT "d":MEMORY &BFF
20 FOR n=0 TO 15:READ a:INK n,a:NEXT
30 FOR n=1 TO 3:READ a,b
40 OUT (&BC00),a:OUT (&BD00),b
50 NEXT n
60 BORDER 0
70 LOAD "!sigscn",&C000
80 LOAD "!",&C00
90 FOR n=1 TO 3:READ a
100 POKE a,0:POKE (a+4),0:POKE (a+5),0
110 NEXT n
120 MODE 1:INK 1,18:INK 3,6
130 CALL &8236
140 DATA 0,6,1,26,24,3,2,13,25,14,26,11,
    3,18,3,6
150 DATA 1,32,2,43,6,24
160 DATA 21251,32026,32348
```

If you looksie into the basic file at the start of Sigma 7 it tells you how to remove the copyright shmear. On, in quick succession, with infinite lives for Disc and Cassette versions of Bombjack 2.

Either rewind to start of tape or forward past first file, or insert the disc then run the program, take your pick:

```
10 MODE 0:MEMORY &175B
20 BORDER 0
30 FOR n=0 TO 15:READ a:INK n,a:NEXT
40 LOAD "!b2screen.bin",&C000
50 LOAD "!b2code.bin",&175C
60 POKE &18EA,0
70 POKE &31BA,0
80 CALL &1770
90 DATA 0,26,1,8,11,10,14,5,20,15,21,25,
   6,3,12,24
```

Before collapsing into a deep slumber (like some of you probably have already), a small quiz: Q. How many programmers does it take to change a light-bulb ? A. None, it's a hardware problem.

Bye! Luv VAX

ACU

THE BUSINESS CENTRE

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Recreate the excitement of Brands Hatch in your front room. Virgin offers you the chance to do this in two ways, either behind the screen or over the carpet.

Unfortunately building a large layout at home is limited by finance and the size of the front room – besides Mum gets a bit peeved when you want to move the aspidistra to make space for a scale model of Dingle Dell.

Virgin to the rescue . . . do it with an Arnold. With the new game you can build your own circuit on the screen, using all the bits of track you want, then race a friend. You don't have to worry about the cat walking on the track and it is far easier on the pocket.

The Grand Prix

One lucky reader of Amstrad User will drive off with a full Scalextric set including power supply, two cars and controllers. The winner and 25 qualifiers will take the chequered flag to walk away with a copy of Virgin's video version.

Prepare to qualify

Life in the fast lane requires sharp sight – you need to look out for blue lights. Our unfortunate bacchanalian wheelbender has obviously failed this test, but he has offered to blow into a bag for his friend in blue just to prove that he is sober. You may think that you are seeing double, but look carefully: Things are not quite what they seem. The two pictures below have some minor differences – spot them to win the prize.





Rules

1. Circle the differences on the illustration and enter the total number on the coupon. The sender of the first correct entry drawn on May 10th (sorry Australia) will win the Scalextric set and a copy of the Virgin game.
2. Twenty five runners-up drawn on May 10th will win a copy of the Virgin game.
3. You may photocopy the form but only one entry is allowed per reader.
4. The judges decision is final, no employees of *ACU* may enter.
5. FISA cannot change the rules to make sure a French entry wins.

SCALEXTRIC ENTRY FORM

I spotted ...... differences.

Name: ....

Address: ....

....

....

Send your entry to:
Scalextric Competition, Amstrad Computer User, 169 Kings Road, Brentwood, Essex CM14 4EF.

The complete personal organiser

Yuppies do it with a filofax, techies use a computer. If your finances are a mess then a computer system can help you to learn to be organised. But if you don't change you'll still be in trouble, as David Foster found out.

PlanIt is a collection of three individual programs called Personal Accounts, Card Index and Financial Diary. In addition, a Loan Calculator is provided and a Calendar is an integral part of the Diary.

It is available on tape and disc for the CPC range and this review is about the disc version. It appears that the only difference is that the disc version has the three main programs linked by a common menu. (A PCW version is also available and is very similar in operation).

What can PlanIt do for you? Well, if you expect it to make instant order out of your chaos, you will be in for a disappointment. To get any worthwhile results from any program you have to be meticulous in the way in which you input the information.

This means that you have to get yourself organised into a routine to regularly enter all the information that the programs require. If you are prepared to do this, PlanIt may suit you well.

The answer to your problems?

PlanIt is supplied on a single disc, complete with a manual, in the all but mandatory "library case". The manual covers both the CPC and PCW versions, but as they are so similar, this causes no problems or confusion. It is well written and describes most features clearly, but is rather short on facts regarding the storage capacities of the various programs.

The three main programs are accessed by typing RUN "PLANIT", which results in a master menu to select which of the three main programs you want to use. The loan calculator seems to be a bit of an afterthought, as it is loaded separately with RUN "LOAN".

The disc is protected and the programs take a long time to load, largely due to the devious protection methods used.

The manual tells you that any roms must be disabled before using PlanIt and a program is provided to disable them if required. If you forget to do this, PlanIt does not warn you and proceeds to load, apparently normally. Only at a later date do you encounter problems, when it is too late to do anything about it.

The first impression of the programs is very good, with a well laid out and presented menu. Instructions are constantly given in a panel in the lower part of the screen and menu selection is by use of the cursor keys to highlight the required option and then by pressing Return.

Selection of options throughout is mostly by use of the cursor keys, and while this is fine when there are only one or two options, it soon gets tedious when you may have to press the cursor 10 or 11 times and then Return to select an option near the bottom of the menu, when it could have been done with a single keypress of a letter or number key. Ideal as a method for selecting with a mouse, but not from the keyboard, and PlanIt does not have provision to work with a mouse.

Personal Accounts

This is perhaps the main part of the PlanIt suite for most people, and is intended to provide the facility to analyse your expenditure, bank and credit card accounts, month by month.

Before using the program for the first time you must specify details of the bank account and any credit cards, together with opening balances. This is where we come across one of the many inbuilt compromises. There appears to be no provision to handle more than one bank account or a building society account, though provision is made for handling up to nine credit cards.

Transactions can be analysed into 24 different categories of expenditure, but there is no way to break down the value of a single payment into more than one category, so don't pay your electricity bill and buy a computer with the same cheque!

Individual statements for bank and credit card accounts can be viewed, printed or sent to a file on disc. There appears to be some slight problem with this part of the program, in that it is possible for credit card statements to not show all the entries, though they are shown elsewhere in the reports and are included in the summary totals.

Transaction reports and cumulative



The main menu which appears when you load PlanIt

Bank: Royal National		Statement of Account		
Branch: Hereford		Account Number 000323		
Date	**Particulars**	**Debited**	**Credited**	**Balance**
b/f				345.81
02/08	000001 Telecom	38.76		307.05
02/08	000002 H Low Ltd	12.00		294.25
02/08	Cash Dispenser	15.00		279.25
04/08	000002 Garage Shop	32.17		247.08
09/08	St Ord NBS	198.71		48.37
15/08	000004 Sport Shop	19.95		28.42
16/08	Credit		88.13	116.55
19/08	Cash Dispenser	25.00		91.55
20/08	000005 Elec Board	51.31		40.24
21/08	000006 Micro Store	18.11		22.13
23/08	000007 Water Rates	90.65		68.52 dr
24/08	Credit Salary		480.00	411.48
	Press any key ...			

A clearly laid-out statement of account

expenditure reports are available at any time, so that you can see your individual transactions for the month to date and also expenditure by category since the start of the accounting period, together with the overall state of your finances.

At the month end you carry out a Month End update, to transfer all standing orders and balances forward to the next month.

Card Index

The Card Index is a very simple database and is ideal for simple names and addresses, but the maximum length of any one field is 22 characters and a maximum of seven fields. The default field headings are names, addresses and telephone numbers, but these can be changed as long as the wording is no more than eight characters long.

If your requirements fit within these dimensions the Card Index works well. Data can be entered, amended and deleted at any time and records may be scanned, viewed one after another or you can jump to a specific record.

Search facilities are provided, and searches may be made on the key (first) field, or all fields. This is fairly rudimentary and it is not possible to search on multiple criteria.

Records may be sorted into ascending order and you can select on which field the sort is to be carried out.

Financial Diary

The concept of the Financial Diary is that you may enter dates and times of appointments, together with details, for any date in the future and these are retained in the activity file for as long as required.

You are limited to 200 entries (maximum, depending on the size of each entry) in the activity file at any one time, but it is possible to store past dates and times in separate files, month by month and these can be referred to and, for some strange reason, altered at a later date by loading them in to the diary.

You must select the date first and then state the time, followed by the appointment or notes. There is also a column to allow you to enter monetary figures and I assume that the intention here is that you can insert expenses at a later date once the appointment has passed.

The maximum size of any one entry is 50 characters, plus the time, and any "money" figure, but you can also add "notes" to include further comments.

Each entry may be marked with a character, and reports may be called to display any or all marked entries for any range of dates covered by the activity file. The money figures may also be totalled. Output can be to the screen or a printer, but not to a disc file.

Entries may be altered or moved to different dates without the need to retype the complete entry.

Incorporated within the diary is a calendar, and this can display any month from 1900 to 9999. I now know that in 9999, my birthday falls on a Monday, or at least I think it does, but the calendar doesn't seem to take account of the rules for leap years according to the Gregorian calendar.

Loan Calculator

For some reason this seems to have funny ideas about what ranges of figures are acceptable, and it will not take interest rates less than 1 per cent. The loan period must be stated in years, which can be awkward if you want to work it out for intermediate periods, though it will accept decimal fractions of a year, assuming you know what they are.

Overall impressions

Visually PlanIt is good, though the more I used it, the more irritated I became with the need to make multiple selections from a number of menus in order to carry out the simplest task.

There are a number of inconsistencies in the use of keys. Sometimes Esc may be used to back out to a higher level menu, but on other occasions, with a similar menu, it doesn't work. Sometimes you select by moving the cursor, but other times you have to type in your selection.

I ended up with the feeling that PlanIt was one person's idea of what he wanted from personal accounting and diary programs and that no one else had been consulted as to whether it suited them, though I am sure that Database Software must have carried out considerable marketing research before producing PlanIt.

Will PlanIt suite your needs? If they are simple and straightforward and you are prepared to be meticulous about entering everything, PlanIt may well be what you are looking for, but I can't help but feel that at the end of the day I could have done it a lot more quickly with pen, paper and a diary.

ACU

At any time you can find out the exact state of your finances

Expense Heading	Total Expenditure
Motgage	198.71
Rent	42.11
Rates	0.00
Electric	51.31
Gas	38.90
Water	90.65
Telephone	38.76
Groceries	41.29
Clothing	12.00
Hobbies	22.95
Vehicles	32.17
Garden	0.00
Social	34.00
Gifts	41.56
House	0.00
Travel	28.50
Misc1	13.44
Misc2	0.00
Misc3	8.92
Misc4	0.00
Misc5	19.00
Misc6	0.00
Misc7	0.00
Misc8	0.00

Total Receipts	568.13	
Charges/Interest	0.00	
Expenditure	715.07	
Period Balance	-146.94	
Opening Balances		
Credit Cards	-12.31	
Bank Account	345.81	
Balance		186.56
Current Bank Bal.	364.04	
Current Cash Bal.	-2.11	
Credit Card Bal.	-175.37	
Balance as at 22/12/86		186.56
Press any key		



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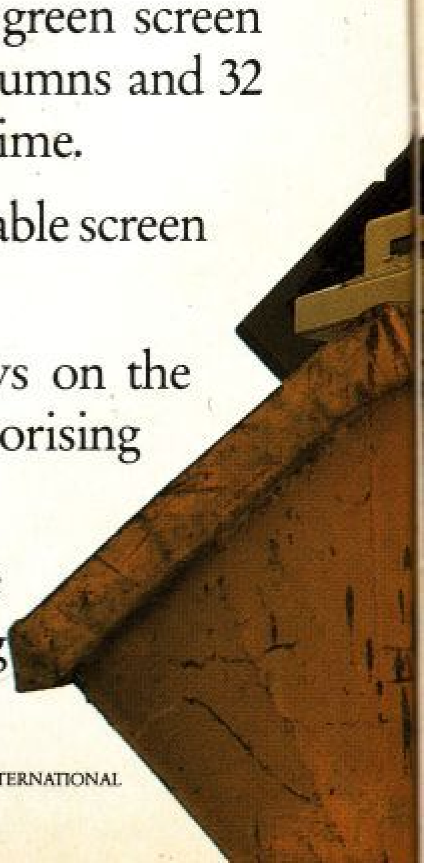
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Seek and ye shall find..

Into adventures with Bill Brock

Want a very good place

One question which turns up in the mailbag at regular intervals is: "How do I learn more about adventures?" This is usually accompanied by a brief explanation that the writer has thoroughly enjoyed his or her first game but has found it difficult to learn the tricks of the trade, and often ends with the plea: "Which adventures would you suggest for beginners in this field?"

The first game often stands out as a highlight, in that it will last in your memory for a lifetime. Because it was something new to you, you will have explored it with all the delight and wonder of an expectant child. The despair felt at each setback is completely overcome by the jubilation on each successful move.

Providing that this first game was not too difficult and that you have progressed well into it, either by yourself or with a little help you are likely to be hooked for life. It was something special, with every few steps an adventure in itself.

Now you know some of the difficulties that are hidden for the unwary and have some idea of how much there is to learn.

There is only one certain way of becoming more proficient at solving adventures and that is practice. This may narrow the field for the choice of the next few games. It would not be sensible or enjoyable to choose a particularly difficult adventure.

What you need is one that CAN be solved with a reasonable degree of persistance, or one for which you can get some useful hints to its problems.

A great deal can be learnt playing a game for which there is a good hint sheet. The best of these that I have come across are those from Level Nine. All Infocom adventures have an optional "invisiclues" hint book, but these are exorbitant and provide full solutions.

The hints are just that. They do not give an answer to a problem but point you in the right direction for YOU to solve it. This way you learn how to tackle an adventure and not just how to cheat your way to the end.

There are several small circulation publications which provide regular hints, tips and solutions. They can be very useful if you are utterly stuck, but they usually consist of the barest essentials.

There is a temptation to simply type in the directions, and although you will complete the adventure, you will not learn a great deal in the process. There is



to start?

no substitute for your very own "brain think".

The following adventures are not just my recommendations, but also feature fairly heavily in your letters. They have all been out for some time and all represent good training grounds. You may very well find that some of the older ones are at reduced prices – especially at exhibitions – and represent even better value for money.

So if you are starting out and don't know which path to take, have a look at:

- The Jewels of Darkness – three classic Level Nine adventures distributed by Rainbird (01-240 8838).
- Jewels of Babylon and Forest at Worlds End – Interceptor (07356 77421).
- Mordons Quest – Melbourne House (01-943 3911).
- Mindshadow – Activision (01-431 1101).
- Neverending Story – Ocean (061-832 6633).

Hints for Jewels of Darkness are available from Rainbird and the others are covered in back issues of The Adventurers Handbook – H & D Services (061-370 5666).

Another adventure specific publication that may help is Adventure Probe. More info from Sandra Sharkey, 78 Merton Road, Wigan WN3 6AT.

Rapid access

One thing about most adventure games that is double edged is their large size. This means that you should get good value for money – either lots of text, plenty of graphics, or a reasonable mixture of both. Unfortunately this is balanced by what often seems to be a very long loading time.

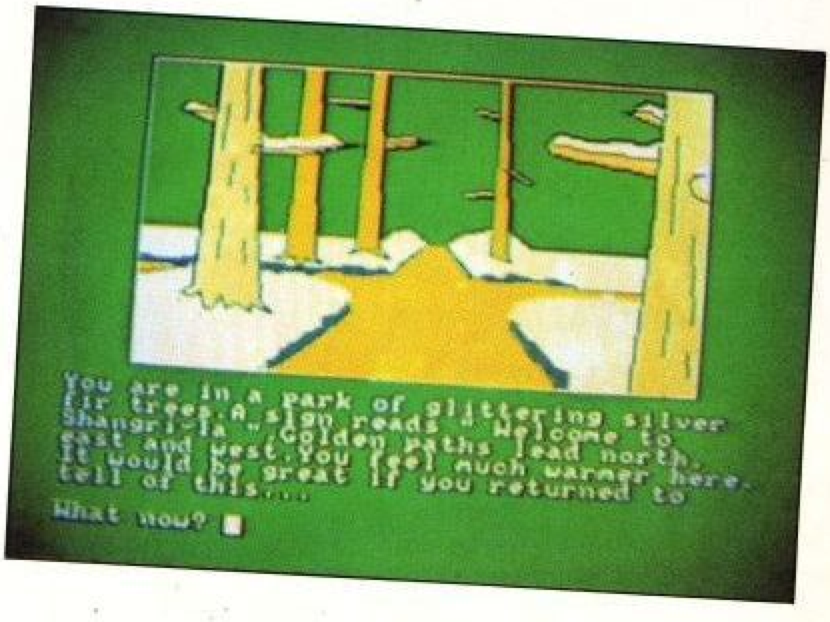
Those of us with disc drives can occasionally buy disc versions but these are rare and cost a lot more than their more common cousins on cassette.

Strong shoes needed

The success of Incentive's Graphic Adventure Creator has resulted in no end of adventure games seeing the light of day. The arguments about whether GAC or Quill is best for you will undoubtedly rage for ages. In the meantime adventurers can only benefit by their use.

Incentive Software has launched the Medallion range of adventures for titles that are written using GAC. The first was Apache Gold and the second, Winter Wonderland, is certainly a good game for the beginner. The puzzles are, on the whole, quite logical and there are plenty of locations to explore and map.

It is also a perfect example of one particular type of adventure writer's ploy – the "go back and get it" stratagem. This means that having started at point A, you have to go to point B to get something you needed at A. You can only then



get something at A which is needed at B to enable you to go back to A for something needed at C!

Obviously the variations on this theme are limitless, and in Winter Wonderland a certain amount of patience and a good map are needed to sort out what to give to whom and when. I hope your shoes will stand up to all their walking around.

You take the part of an anthropologist who has got wind of a hidden civilization buried deep in the Himalayas. In the rush to reach the friend who has discovered evidence to support this find, you take a risky last leg flight in an old Cessna aircraft. Bad weather intervenes and you are swept into the mountains by a freak snowstorm.

The plane crashes but you get out alive only to find

yourself in the middle of a snow-swept plain. Eventually you stumble across the lost civilization, and although you are fascinated by the amazing similarities to the modern world outside, your main aim is to escape and report your find.

The idea of the plot is OK, but its interpretation is a bit dubious – with a hotel receptionist telling you that you were expected, dry Martini on sale in the off license, credit cards, postmen and the odd hang glider all appearing within this long-lost Shangri-La.

The best bet is to forget the plot altogether and just get stuck into solving the adventure. Look on it as a series of interlocking puzzles that you must solve.

Inputs are pretty much limited to verb/noun format, but multiple commands separated by comma, AND or THEN are accepted. The responses to examining many objects is simply "Nothing worth reporting back about" but do not be put off – examining things will pay off.

For all this lack of textual atmosphere, Winter Wonderland is good fun and will keep many advertisers busy for a long time. There are a number of good graphics, and beginners will have plenty to explore and discover.

Pictures are drawn to the screen quite quickly but they may be turned off to speed things up by the TEXT command.

Regular use of the SAVE command is to be recommended, as many red herrings will be caught and you will want to return to a known position. If you get stuck Incentive will send you a hint sheet on receipt of a stamped addressed envelope.



Just imagine

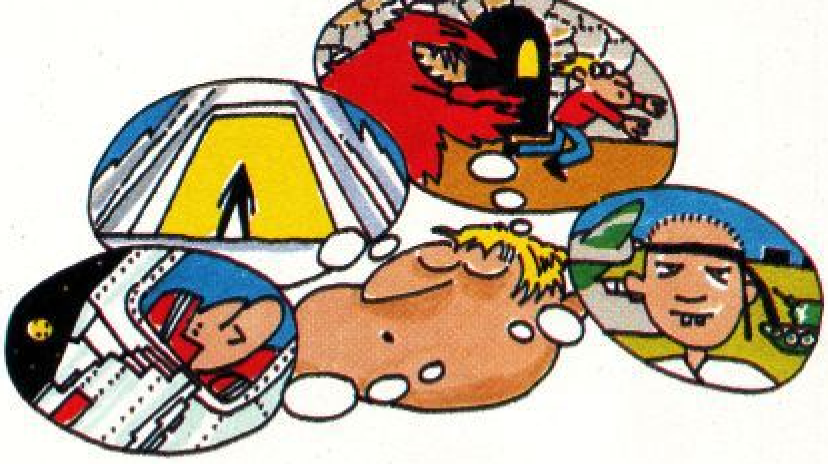
Another game requiring a fair amount of travelling backwards and forwards to get various objects is Firebird's latest adventure in their £1.99 Silver range, Imagination.

This starts with you finding an old, unnamed disc in your local computer shop. Taking it home and running it on your computer, you find a menu appearing on the screen. Four options are displayed and keying in your choice transports you into that scenario. The sensible and logical selection of ONE will give you a hint to your mission.

The first scene will take you to a spaceship, supposedly of gigantic proportions but with apparently only eight accessible locations. The second produces a frozen landscape with an imposing citadel, that you must find out how to enter. Again with a limited number of locations.

The third takes you to a world containing malevolent sprites, grim mines and, if you have played many ladders and platforms games, the distinct feeling that you have been here before.

The final option is a deserted airport at Margate where



there is an ancient tank, an aged bomber and a seventh dan black belt Japanese soldier who disputes your right of passage.

If at any time you want to return to sanity, sitting in front of your computer, just type PINCH ARM and you are back in the opening sequence, all set to enter another one of the worlds. It will become obvious very quickly that to solve any of the puzzles you must zip backwards and forwards between the four sections – to get items which will be useful elsewhere.

The concept of four totally different sections linked in this way is interesting. This game could represent good value for money for the beginner even though there are not many locations to explore.

The puzzles are logical and reasonably obvious, but the depth of interest is not likely to be maintained for the more experienced player.





The continuing saga

The first computer game featuring that mixed-up teenager Adrian Mole went down rather well. Those that follow his adventures and feel personally for all his problems should now be lining up to buy the sequel, The Growing Pains of Adrian Mole.

This is not strictly an adventure game, but comes more into the category of Bookware. The screen lists excerpts from the daily life of your young friend and you have the onerous task of choosing one of three actions for him to take.

This leads to the result of that choice, and the poor lad then has to sort out the next critical decision in his life with your help.

There are a few random happenings, so the game will appear slightly different when you play again. The aim, apart from enjoying the story, is to increase your score and hence Adrian's popularity.

The program is written by Level Nine and follows the book's ideas and feelings as faithfully as possible. It comes in four parts – do not rewind the tape when you have loaded each section.

Although there are graphics, they are not exactly plentiful or very inspiring, and once or twice the text scrolled too fast to read.

Each part takes from between five and twenty minutes to play. You can, of course, repeat a section to find the results of alternative answers.

As each part takes about five minutes to load there may be a slight question about the overall value. For those who are already hooked on Adrian Mole it may be worth the money; for others I would suggest reading the book first.



Scores	Winter Wonderland	Imagination	Adrian Mole
Plot	60	65	65
Atmosphere	60	57	60
Addiction	65	55	45
Difficulty	57	45	0
Overall	63	57	55

ACU

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TELECOM GOLD

NEWSLETTER

MicroLink on the rates

BRITAIN'S 105-year-old Rating and Valuation Association has taken a giant stride into the 20th Century with the help of MicroLink.

Previously, the professional organisation for property experts in local government and private practice depended on phones and letters to communicate. It didn't even have telex.

Now its 5,000 members – town hall finance and housing administrators, and chartered surveyors and valuers – will benefit from not only telex, but also electronic mail and Telemessages.

The Association conducts a four year course leading to professional exams, provides an information service, publishes text books, and holds between 70 and 80 conferences a year.

Assistant secretary Julian Price said:"MicroLink will give us the means to speed up our organisational communications, moving documents to and and fro between our Council members who are located all over the country, contacting our members and exchanging information with our affiliates in the US.

"It will also help us organise our conferences, book hotels and speakers and make travel arrangements for delegates".

Software hotline fills the gap

A REVOLUTIONARY support package for business and communications software users which includes membership of MicroLink has been launched by systems consultancy and software design firm Interlex.

It will provide previously unavailable support for the lower-priced – generally under £150 – software packages.

In addition, MicroLink will provide Interlex users with the bonus of electronic mail, telex and other comunications facilities and databases.

Interlex managing director Mike Lane said:"As the trend toward low cost hardware and software has gathered momentum, the traditional dealer network has moved upmarket.

"Consequently the bulk of new business micro users have been left totally unsupported because the High Street and volume sellers supplying them are not geared up for the task.

"Interlex will fill the vacuum by supplying support at a price the new generation of users can afford.

"Initially this will be provided through a telephone hotline, but we are pushing ahead with plans for an Interlex bulletin board on MicroLink to extend the service to comms users".

Japan comes to Salop

MICROLINK was the catalyst for language school proprietor Duncan Baker's latest venture – teaching Japanese to British business people.

The new addition to the curriculum at Lydbury English Centre in Shropshire developed from a sociable electronic mail exchange on MicroLink with antiquarian bookseller Tony Swann.

Swann revealed a long cherished ambition to study Japanese and suggested that Baker organise a course.

This has now been done, and after being advertised on MicroLink half the places were filled within a week.

High peak, low tech in Tibet

ACCORDING to crack mountaineer Chris Bonington, "it's only a small trip compared to climbing Everest and I'm looking forward to coming home and getting to grips with MicroLink".

He was speaking a few days before leaving for Tibet, hoping to add the unconquered peak of Menlungste to his own collection of Himalayan "scalps".

When he's not climbing mountains Bonnington can often be found at a computer keyboard writing one of his numerous books and articles or simply mastering the latest micro technology.

A self-confessed computer buff, he has joined MicroLink because it will help him organise his expeditions.

"The telex facility will be absolutely invaluable in this respect", he said. "At present I have to rely on the generosity of my accountant and use his office telex machine if I want to send and receive messages, but obviously this isn't always convenient for either of us.

"Transmitting text to my publishers is a definite possibility. They are a rather old-fashioned firm, but who knows, I may be able to convert them to Email. As a newcomer to MicroLink I'm also looking forward to exploring its many sections just for the fun of it.

"Unfortunately I won't be able to use MicroLink to keep in touch with home while I'm in Tibet. Where I'm going is so remote that my messages will have to be carried by runner for three days before they reach the nearest road".

YOUR chance to join MicroLink – turn to Page 14

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Viglen Viglen



Lights! Camera! Action!

Imagine an Electronic Eastenders, a Digital Den, a pixellated Pauline or a computerised Colin. You can create all these characters with the help of a video recorder and a Rombo Vidi digitiser.

The Vidi takes a television signal from either a video recorder or camera and turns the output into numbers. The computer then turns the numbers into a picture which can be edited by using something like Art Studio. Coupled with the Rombo Romboard the digitizer is an excellent package and you have a chance to win the set-up of a Vidi and Romboard. You will have to supply the video, the computer and the creative genius.

How to Win!

Answer these three questions about television and you could win the Vidi.

1: Who invented television?
(a) John Logie Baird. (b) Alexander Fleming. (c) Graham Bell.

2: Which is the odd one out
(a) VHS. (b) Betamax. (c) Polaroid.

3: Where was the first television transmitter in Britain?
(a) Crystal Place (b) Ben Nevis
(c) Westminster

Rules

1. The sender of the first correct entry drawn on May 10th (sorry Australia) will win a Rombo Productions Vidi interface complete with Rombo romboard and software.
2. You may photocopy the form but only one entry is allowed per reader.
3. The judges decision is final, no employees of ACU may enter.

ANSWERS

1 ____________________
2 ____________________
3 ____________________

NAME ____________________
ADDRESS ____________________
____
____

*Send your entry to: **Vidi Competition, Amstrad Computer User, 169 King's Road, Brentwood, Essex CM14 4EF.***

Constructing Ambug

The roboteer's route map

There is more to computing than just pounding on the keyboard. Rupert Goodwins presents Ambug, a robot for you to build and run from the back of your CPC.

Before you can build your robot, you'll have to have all the requisite bits. These include not just the guts of the beast, but the tools to do the job with. Although it is possible to knock together Ambug with just a pair of scissors and a knitting needle heated over the gas stove – how the author's very first project was hung together – it's not recommended. What you'll definitely need in the way of tools includes :

- A soldering iron. 15-25 watts, with a fine tip will do nicely. Available at almost any DIY/hardware/electronics shop.
- Wire cutters. The most appropriate kind are called side snips or side cutters. Found in the more specialist (Tandy's, say) shops.
- Scissors (cardboard chassis, for the cutting out of).

A list of desirables, which will make your job a lot easier but can be left out if finance so dictates, will include :

- Desoldering pump. This can remove solder if a component needs to be replaced or moved.
- Long nosed pliers. These make bending component leads much easier and more accurate.
- A small bench vice. If you've never done it before, you'll soon find that soldering needs at least one extra hand – two are just not enough!

The budding roboteer will also need to beg, borrow but not steal (only the truly dedicated need buy) a test meter. This needs to measure up to 15 volts, check resistance and measure direct current of up to an amp or so.

If access to a secondary school or higher educational establishment is available, the physics/IT staff are usually more than happy to help out seekers after truth with a dead droid. And they've got test meters.

Got the lot? Good. Before you start sticking diode A into hole B, lets get a few of the basics of electronicing down pat.

First, there's the gentle art of soldering, or how to make the perfect joint (calm down Vax). A joint, by the way, is a soldered connection.

In theory, it sounds quite simple. Heat two bits of metal up, pour molten solder over them, and allow to cool. But there's a few things to watch.

First, all the metal surfaces must be clean and free of grease or corrosion. As you'll be using new bits, that shouldn't be a problem, but if you can see grunge adhering to your wiry bits the trick is to pull the wire through a piece of folded sandpaper a couple of times.

Second, there's the technique. Some people push solder on to the end of their irons and just dump it on the connection.

Wrongo. The trick is to apply the iron first, allow the connection to get nice and warm, and then push the solder on.

Another fatal no-no is to use too much solder. Just put enough on to cover the surfaces around the area of the joint. It should flow on easily, if it doesn't then either the connection is too cold (let the iron stand for a few minutes), or one of the surfaces is dirty.

Practice on a few stray bits of wire until you get the feel of glueing with molten metal. When it comes to soldering stranded wires into place, it helps if they're tinned.

Tinning isn't an Irish calorie-controlled diet, it's the method of coating connections individually with solder before bringing them together. To tin a bit of wire, strip off about 5mm of insulation, twist the strands together, and apply to a soldering iron.

Push a little solder on. You should aim for an end result where the wires are no thicker than before the solder was applied, but are stuck together by a fine veneer of liquid engineering.

If you do this to both ends of the ribbon cable (after separating the strands, of course), you'll find it a lot easier to solder them to the PCB when the time comes. You'll notice that the PCB comes ready-tinned. No expense has been spared . . .

Now the fun begins. Take the PCB and put in all the wire links. These are best done by cutting a piece of wire about 1 cm longer than the length needed on the board, and bending the ends through 90 degrees so that the link just fits into the board.

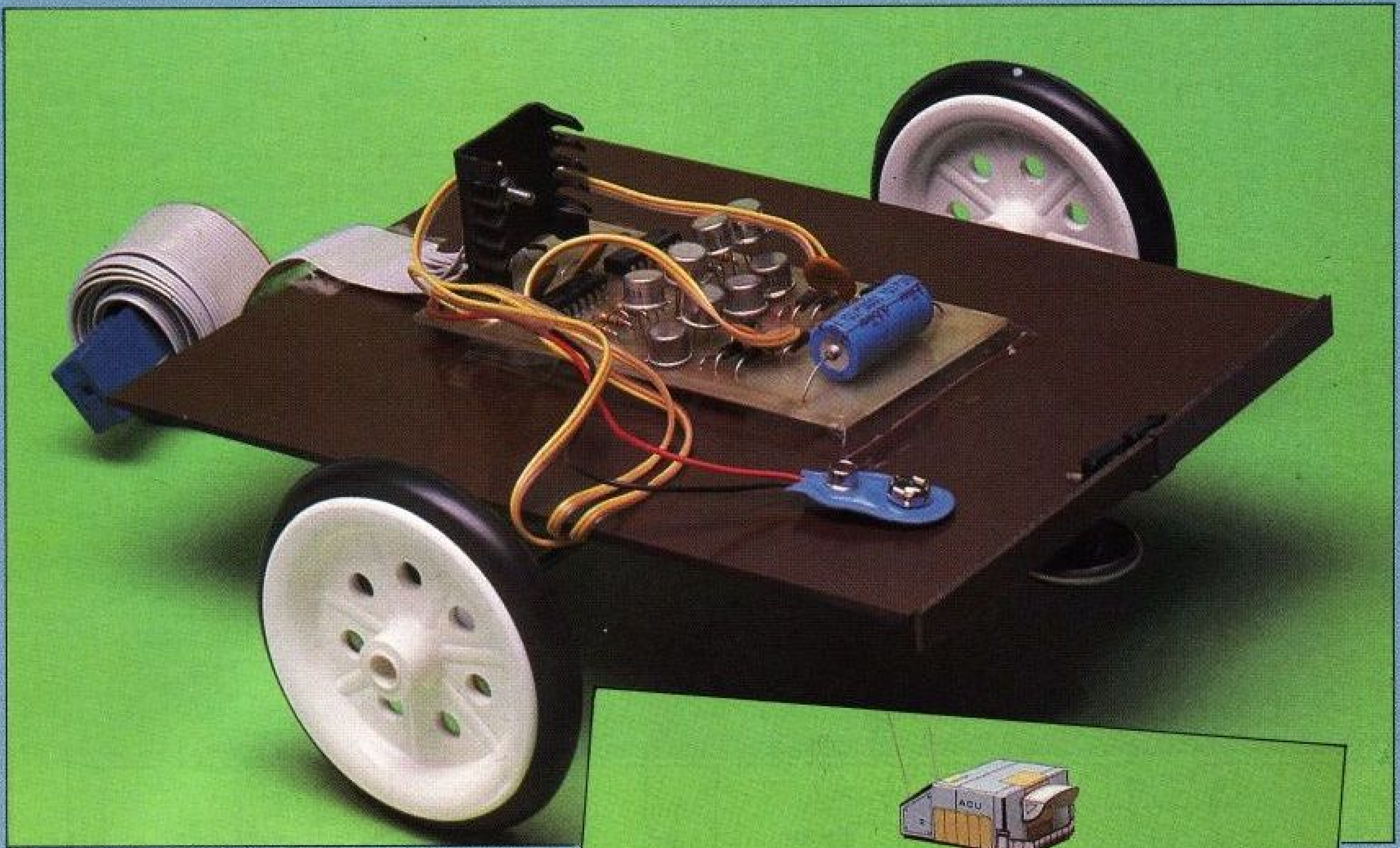
Then solder both ends, and trim off the spare bits as close to the board as possible. Then solder in the IC sockets and the ribbon cable.

Next, solder in the capacitors and the resistors – see the ID chart supplied with the kit to tell which is which.

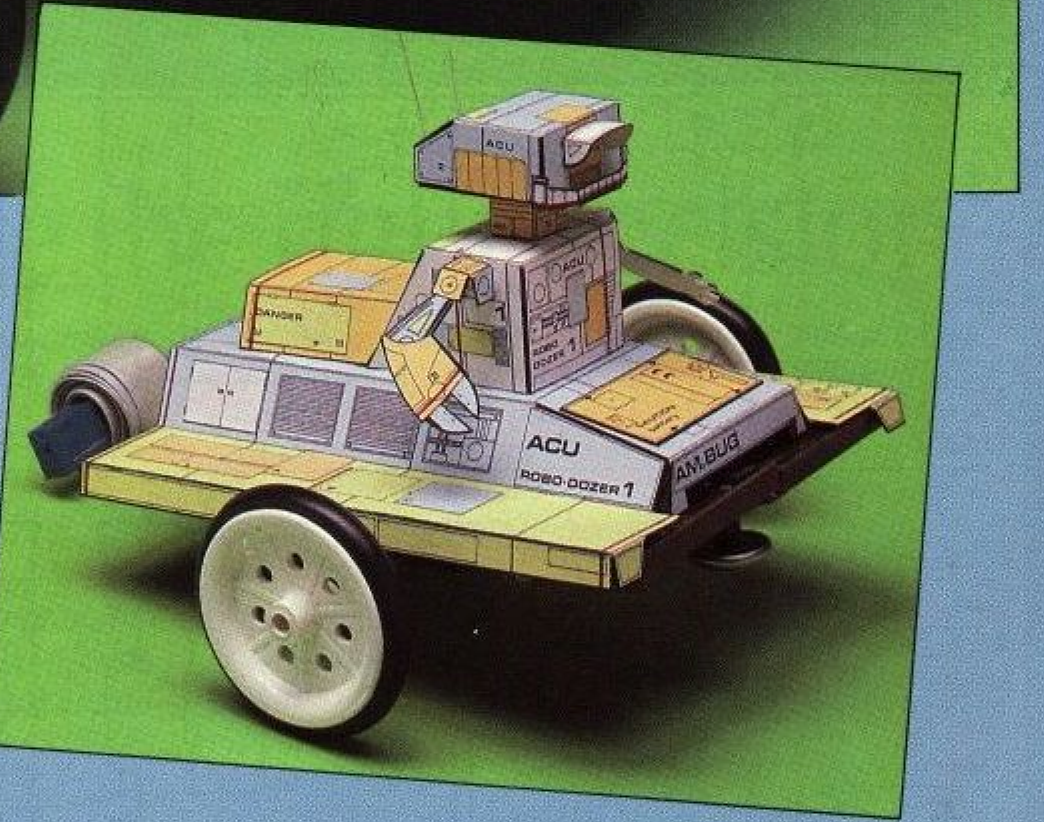
The resistors and small capacitors can be soldered in either way round, but the big capacitor needs to be plugged in correctly.

Put the diodes, transistors and the ICs in last. The transistors need a little bit of extra care during soldering – don't hold the iron on the joint for longer than five seconds, and allow everything to cool for ten seconds between soldering each leg.

Make sure that those trannies are aligned correctly, and that the right types are in the right place. Ditto for the diodes. The ICs should be soldered



A fully built Ambug (above) and shown wearing its new clothes (right)



in last. The two long flat ones are the same as each other, but make sure that the notch in one end matches the diagram.

Solder on the joystick connector and the printer port connector. Connect the two sensor lines to pins 1 and 2 of the joystick plug, and the common earth wire to pin 8.

Similarly, connect the lines M1-M4 on the PCB to pins 2-5 of the printer port, and L1-L2 to pins 6 and 7, with the earth wire going to 22. You'll find pictures of the connectors in the back of your Amstrad user manual.

Then solder in the 7805 IC – the one with a black body, three legs and a metal plate. Screw on the heatsink to this plate, making sure it doesn't touch anything else. Then solder in the battery connector.

Finally for now, solder on the switches – don't bother to glue them on to the baseboard for now, and just plug in the joystick connector. Turn your Amstrad on.

Try the test program:

```
1Ø PRINT JOY(Ø);" ":GOTO 1Ø
```

You should get a screenful of 0s, which change to 1s, 2s and 3s as the sensor switches are pressed.

If you only get one or two numbers check your wiring for short circuits, and make sure that you've got the numbering on the joystick plug right. Getting it wrong can't hurt anything, and it's a good check to make sure that you've understood the elementary aspects of construction.

Next, switch everything off and connect the motors and the light emitting diodes. The LEDs have to be soldered in the right way round, as they don't work (ever again) if you get it wrong.

Don't bother hooking up the gear-

Motors never turn	IC3, battery polarity.
Motor 1 turns in one direction only	TR1, TR2, TR5, TR6 and IC1.
Motor 2 turns in one direction only	TR3, TR4, TR7, TR8 and IC2.
Motor turns sluggishly and transistor overheats	Resistor connected to transistor, IC1 or 2, diodes connected to motor.
D9 stays on continually	TR9, R11.
D9 never lights	R9, R11, TR9
D10 stays on continually	TR10, R12
D10 never lights	R10, R12, TR10.
Motors judder or change direction randomly	C3, C4, C8.

Always check connections to the computer and battery state before suspecting electronic foul play!

Table I: Possible problems and how to diagnose them

boxes yet. Plug in the printer port connector and the battery box. Switch on again.

If one or other of the motors starts try switching on again. If the condition persists switch off and check the wiring around ICs 1 and 2, the area around the transistors and the arrangement of the diodes. Make sure you've remembered all the wire links.

If that proves nothing, then there's a faint chance that you damaged one of the transistors when soldering them in.

Assuming that the motors stay satisfactorarily silent, then try OUT &EFFF,1 from Basic. One of the motors should start. OUT #EFFF,2 should reverse it, and OUT #EFFF,0 should stop it again.

The other motor can be likewise tested by OUT #EFFF,4, OUT #EFFF,8 and OUT #EFFF,0. To make the motors both do something at the same time add the numbers together, so OUT #EFFF,5 should get both turning.

Similarly, OUT #EFFF,16, OUT #EFFF,32 and OUT #EFFF,48 should turn the lights on. If the motors start up when this happens you've got a crossed line; either there's a short in the plug or PCB end of the ribbon cable, a short on the PCB, or a miswiring. Turn off, unplug and check everything carefully.

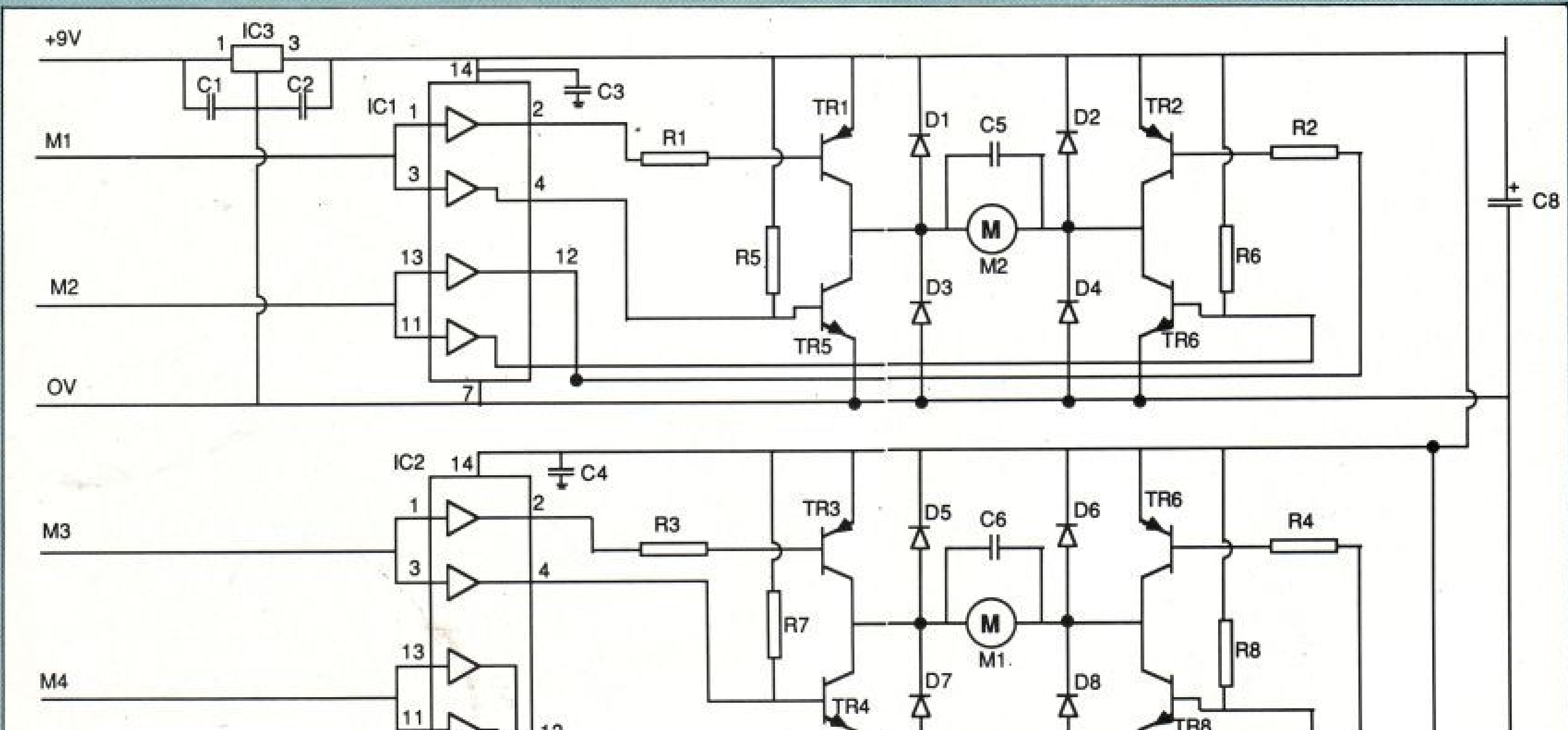
If one or the other of the motors or lights won't work have a look at Table I, which should help you diagnose your disaster.

A little logical thinking, together with a read of the "How it works" bit, should help you sort out your problems. Debugging hardware is much like debugging software, as long as you have an idea of what should happen!

Try to use an alkaline battery or batteries, or even better, rechargables. Ambug takes quite a lot of juice when belting along on its mission to save the world, and not an inconsiderable amount just sitting there. Unplug the batteries whenever you're not using Ambug.

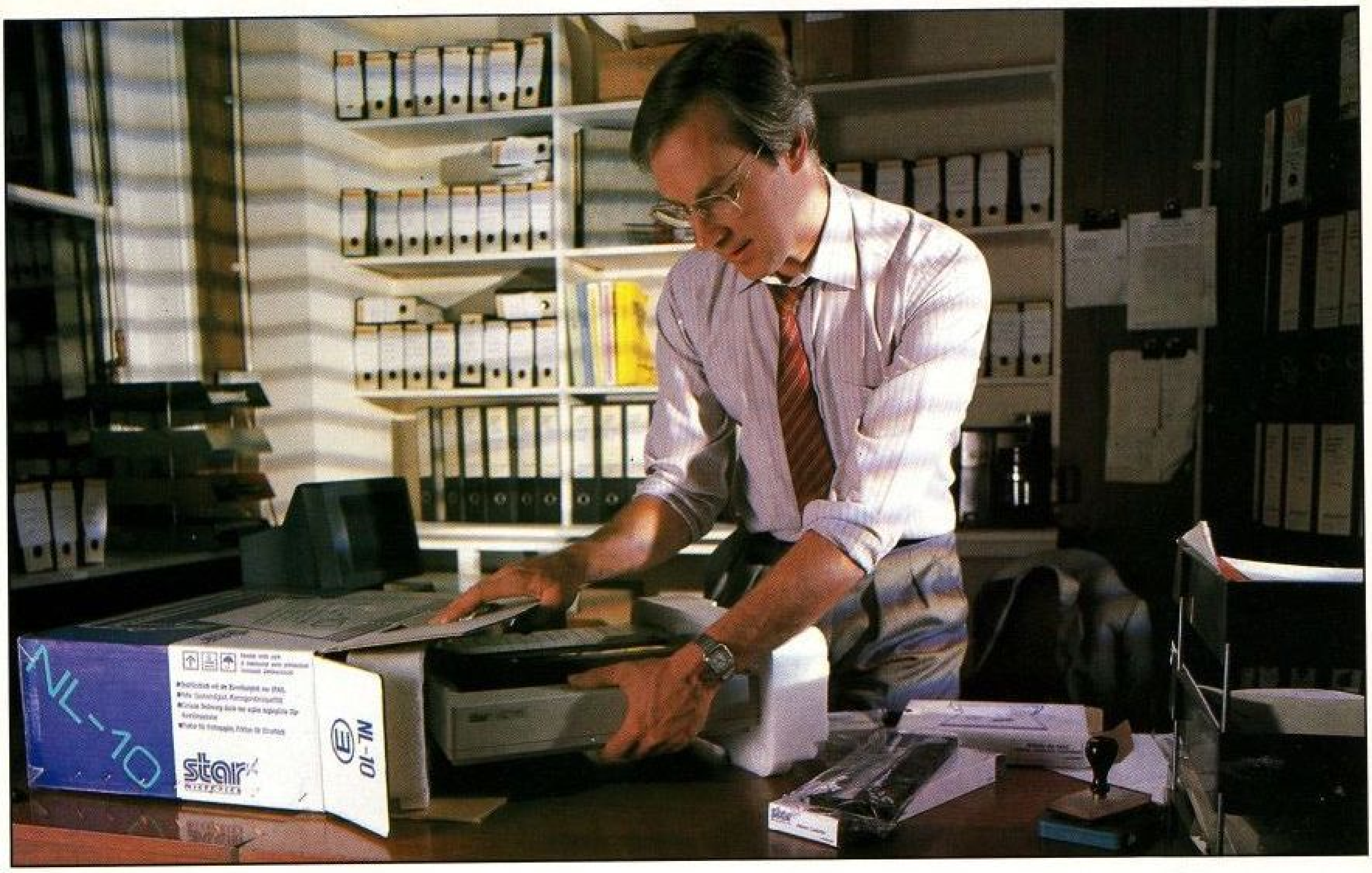
It all works? Great! Now you can mount the hardware. If you're using the kit of bits full instructions come with it. If you're busking it (brave fellow/lass), then any old bit of wood should serve as a baseboard as long as it's not too flexible.

The official way of putting the gearboxes and bumpers on is with nuts and bolts. Personal experience has shown



IC1, IC2 =	7417
IC3 =	7805
C1, C2, C3, C4, C5, C6 =	0·1μF, 25vw
C8 =	1000μF, 6vw
TR1, 2, 3, 4 =	BFX88
TR5, 6, 7, 8 =	BFY51
TR9, TR10 =	BC108
D1-8 =	IN4001
D9, D10 =	LED
R1, R2, R3, R4, R5, R6, R7, R8 =	150Ω
A11, R12 =	1K
R9, R10 =	470Ω

Circuit diagram for DIY fans



You've made the right decision

Star makes it easy to choose the right printer when it comes to those difficult decisions. From the small business or enthusiast user through to the highly demanding corporate buyer, there's a printer in our range to suit every need.

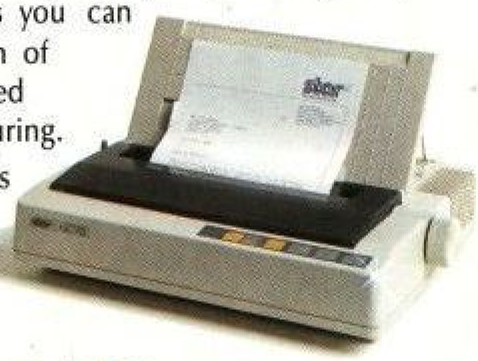
Take the NL-10 for example. You need to choose a printer that's compatible with the computer you're using today and the one you might upgrade to later. With the NL-10's modular interface that's no problem, just select the interface you need when you buy the printer. If you need to change later it only takes a moment to swap the cartridges over.

You'll want to choose a printer that's easy to operate. On the N series printers Star have all but done away with those fiddly little DIP switches. Almost every control you need for daily use is on a single touch panel. Select print quality, character size, margins and a host more options without ever having to lift the lid.

You want to choose a printer that looks after all your paper requirements; tractor, single sheet or multiple copies. The NL-10 has tractor feed as standard for continuous printing and an automatic single sheet feed to make letterheads really easy. There's even the option of a low-cost cut-sheet feeder.

Your ultimate choice is print quality. Print quality isn't often expected of dot matrix printers but the NL-10 provides it as standard. Whether you're printing at 120cps in draft mode or 30cps in Near Letter Quality every character is crisp and clear. And the range of character options is unbeatable.

Star is making it easier to choose the right printer when it comes to service and backup. Our pedigree is inherited from many years in the manufacture of precision machine parts and a long history of producing computer printers. This means you can rely on Star's wealth of experience in advanced design and manufacturing.



Countless users have made the right decision – why not join them?

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that superglue does the job just as well, if correctly applied.

Them that know reckon that the hardware's only as good as the software. With Ambug, the hardware's pretty good, but the software depends on exactly what you want to do with the poor thing.

However, owners of buggys invariably seem to take a delight in making their beasts bash against the nearest solid object and turn away in a daze. What the psychologists call a conditioned response.

Others take great pleasure in persuading their hardware to engage the cat in hot pursuit. Shrinks everywhere know this as out-and-out nastiness. So here are two programs to give the proud possessors of Ambugs a chance to sample the joys of dubious droidery.

Programs to try

Program I is a very basic Basic maze-learning program. Even that's being a bit grand; all it does is trundle Ambug forward until it hits something bigger than it is. It turns until it gets an all clear ahead, and then continues.

The clever bit comes when its master deigns to press the s key on the Arnold. With heartwarming faith and Mensa-like intelligence, Ambug will return to it's starting point, without hitting anything. At least, that's the theory.

The second program is a bit simpler. All it does is make Ambug obey the keyboard – Q for left, W for right, P for forward and L for back. If you're feeling particularly bright you might like to combine the two, so that you can teach Ambug a path with the old keyboard.

Depending on exactly how your Ambug is wired, you might need to swap the values for Goforward and Goback in line 50 of both programs. Similarly, Goleft and Goright, Left and Right might need a little juxtaposition.

```
10 REM AMBUG DRIVER PROGRAM
20 REM by Rupert Goodwins
30 REM          1987
40 REM
50 AMBUG=&EFFF:n%=1:right=1:left=2:both=
   3:goright=9:goleft=6:goforward=10:gob
   ack=5:halt=0
60 l1=16:l2=32
70 DEF FNti=TIME-datum
80 motor=goforward:lights=l1
90 EVERY 25 GOSUB 510
100 DIM a(200),b%(200)
110 datum=TIME:exploring=1
120 REM Now store up to 200 changes in d
    irection
130 WHILE n%<200
140 press=JOY(0):IF press<>0 THEN GOTO 1
    70
150 IF INKEY$<>"s" THEN GOTO 140
160 GOTO 280
170 REM Work out new direction for Amby
180 REM If both switches are pressed
190 REM it's a head-on crash. Reverse
200 REM for a second, and then turn 90 d
    egrees
210 IF press=both THEN MOTOR=goback:GOSU
    B 400:delay=1:GOSUB 470:MOTOR=gorigh
    t:GOSUB 400:delay=1:GOSUB 470:MOTOR=
    goforward:GOSUB 400:GOTO 260
220 REM IF one switch is pressed, just t
    urn
230 IF press=left THEN MOTOR=goright:GOS
    UB 400:delay=1:GOSUB 470:MOTOR=gofor
    ward:GOSUB 400:GOTO 260
240 REM if the other switch is pressed,
    turn t'other way
250 IF press=right THEN MOTOR=goleft:GOS
    UB 400:delay=1:GOSUB 470:MOTOR=gofor
    ward:GOSUB 400
260 WEND
270 REM That's all the moves recorded
280 REM Now do the changes in direction,
     backwards.
290 datum=TIME:exploring=0
300 FOR f%=1 TO n%
310 b%(f%)=15 AND (b%(f%) XOR 15)
320 NEXT f%
330 FOR f%=n%TO 1 STEP -1
340 motor=b%(f%):GOSUB 400
350 nextmove=TIME+(a(f%)-a(f%-1))
360 IF TIME<nextmove THEN GOTO 360
370 NEXT f%
380 REM And stop!
390 MOTOR=HALT:GOSUB 400:STOP
400 REM Send a command to Ambug and reme
    mber it
410 DI
420 LET command=motor OR lights
430 OUT ambug,command
440 IF exploring=1 THEN a(n%)=FNti:b%(n%
    )=motor:n%=n%+1
450 EI
460 RETURN
470 REM wait for DELAY seconds
480 LET oldtime=TIME
490 IF (TIME-(300*delay))<oldtime THEN G
    OTO 490
500 RETURN
510 REM Flash lights, but don't record i
    t as an event
520 IF lights=l1 THEN lights=l2 ELSE lig
    hts=l1
530 oldexp=exploring:exploring=0
540 GOSUB 400
550 exploring=oldexp
560 RETURN
```

Program I

Incidently, Amstrad Basic is rather good for this sort of control program. You might notice the use of EVERY... to flash the eyes at a fixed rate – with a little more work the rate could change according to the direction Ambug is moving in.

Making Ambug learn a maze so it can find the shortest route would take a lot more programming. If enough Ambuggers (ahem) pester the Ed an article on how to do it might be forthcoming. Go on – it's what he's there for.

The easy option

Dedicated hardware hackers will sneer at this bit, so stop reading and go and plug in your soldering iron. The rest of you will want the soft option.

A kit is available which contains all the parts for a buggy for £21 plus £1 post and packing. If you wish to order from overseas please call for details.

The Ambug kit includes all the parts you'll need such as the PCB, motors, baseboard and wheels. You may order the kit directly from Magenta Electronics on 0283 65435 or by filling in the form alongside.

```
10 REM AMBUG DRIVER PROGRAM II
20 REM  by Rupert Goodwins
30 REM        1987
40 REM
50 AMBUG=&EFFF:goright=9:goleft=6:goforw
   ard=10:goback=5:halt=0
60 l1=16:l2=32
70 motor=halt:lights=l1
80 EVERY 25 GOSUB 200
90 IF LOWER$(INKEY$)="q" THEN LET motor=
   goleft:GOSUB 140
100 IF LOWER$(INKEY$)="w" THEN LET motor
    =goright:GOSUB 140
110 IF LOWER$(INKEY$)="p" THEN LET motor
    =goforward:GOSUB 140
120 IF LOWER$(INKEY$)="l" THEN LET motor
    =goback:GOSUB 140
130 IF INKEY$="" THEN LET motor=halt:GOS
    UB 140
140 REM Send a command to Ambug and reme
    mber it
150 DI
160 LET command=motor OR lights
170 OUT ambug,command
180 EI
190 RETURN
200 REM Flash lights
210 IF lights=l1 THEN lights=l2 ELSE lig
    hts=l1
220 GOSUB 140
230 RETURN
```

Program II

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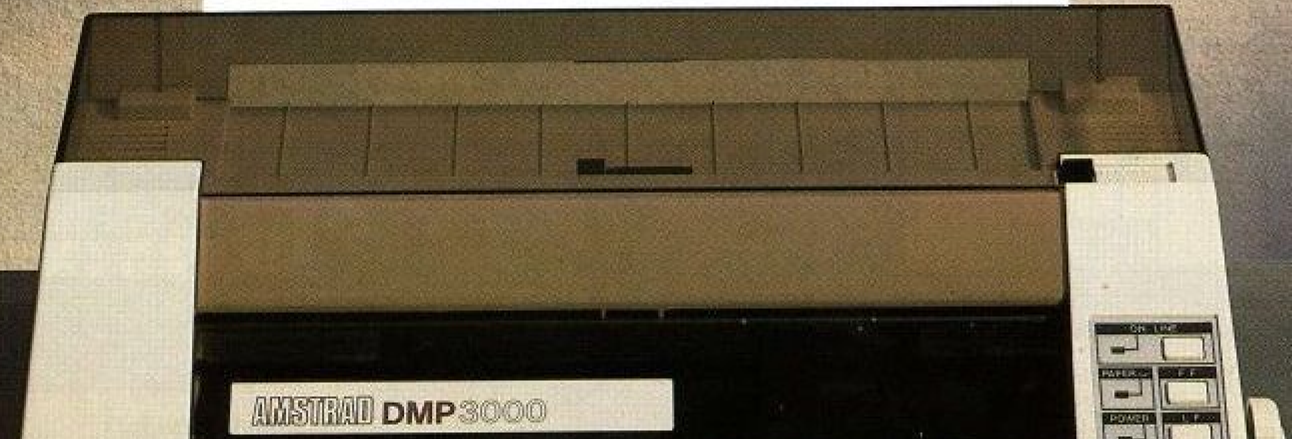
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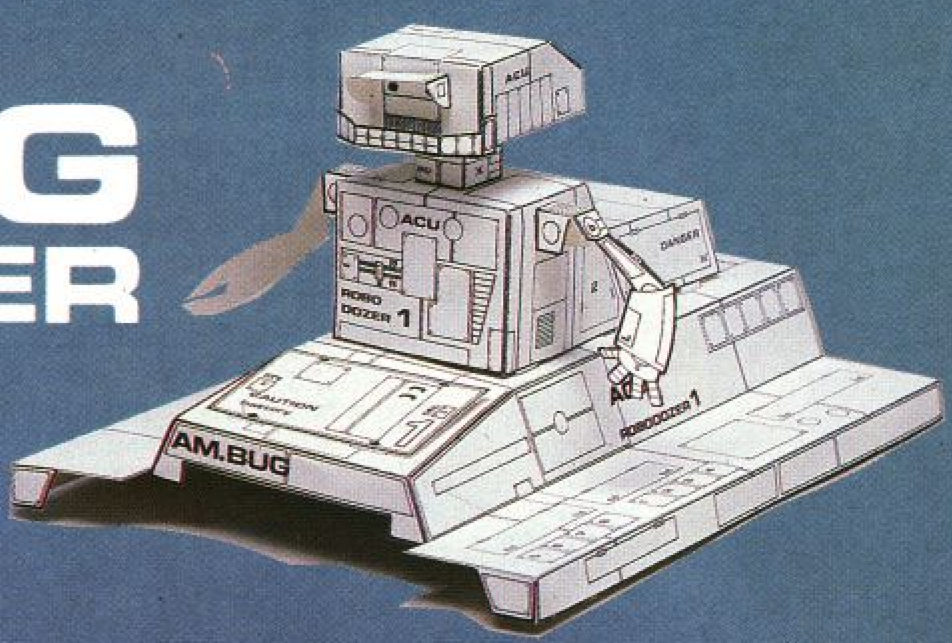
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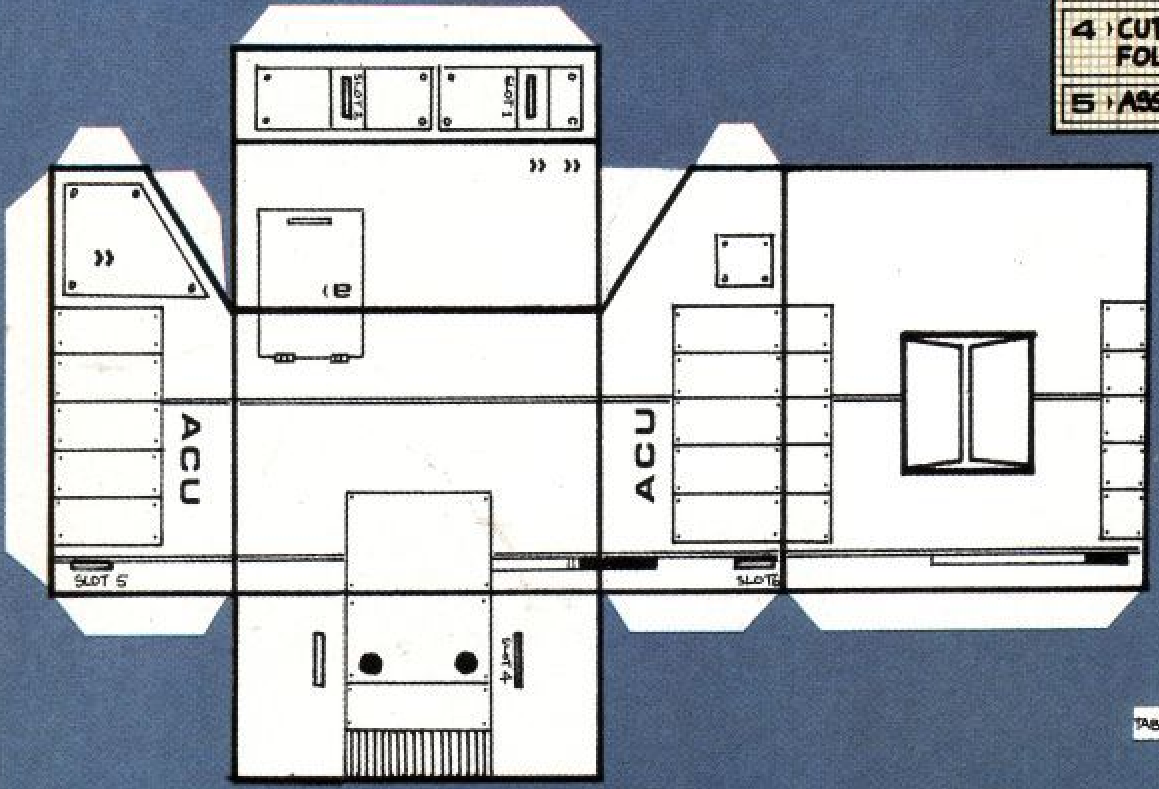
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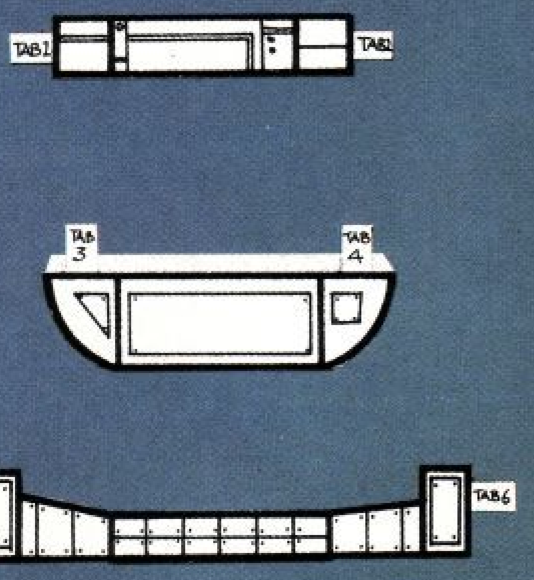
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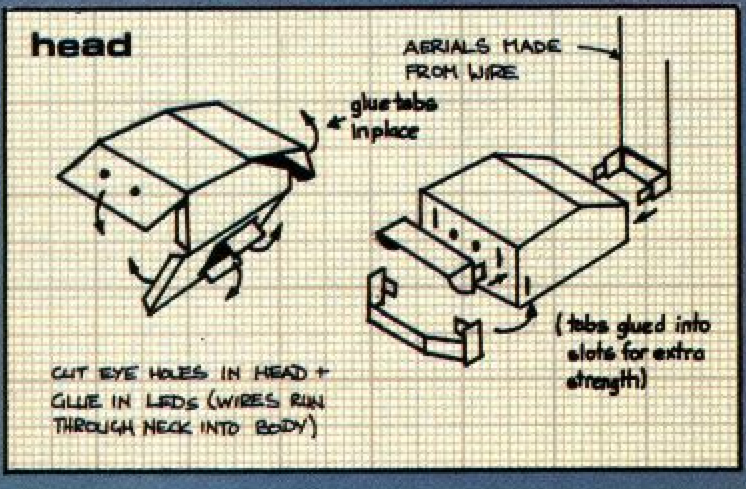
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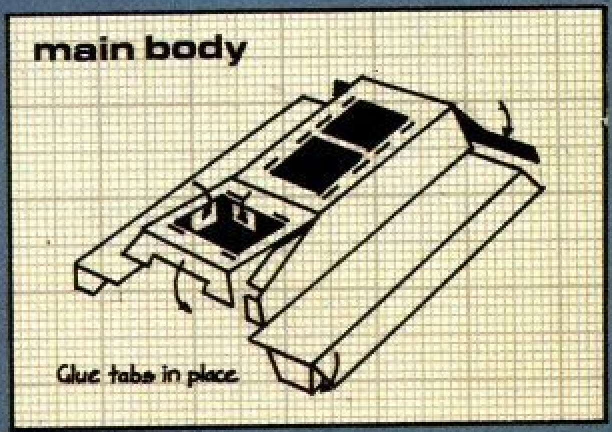
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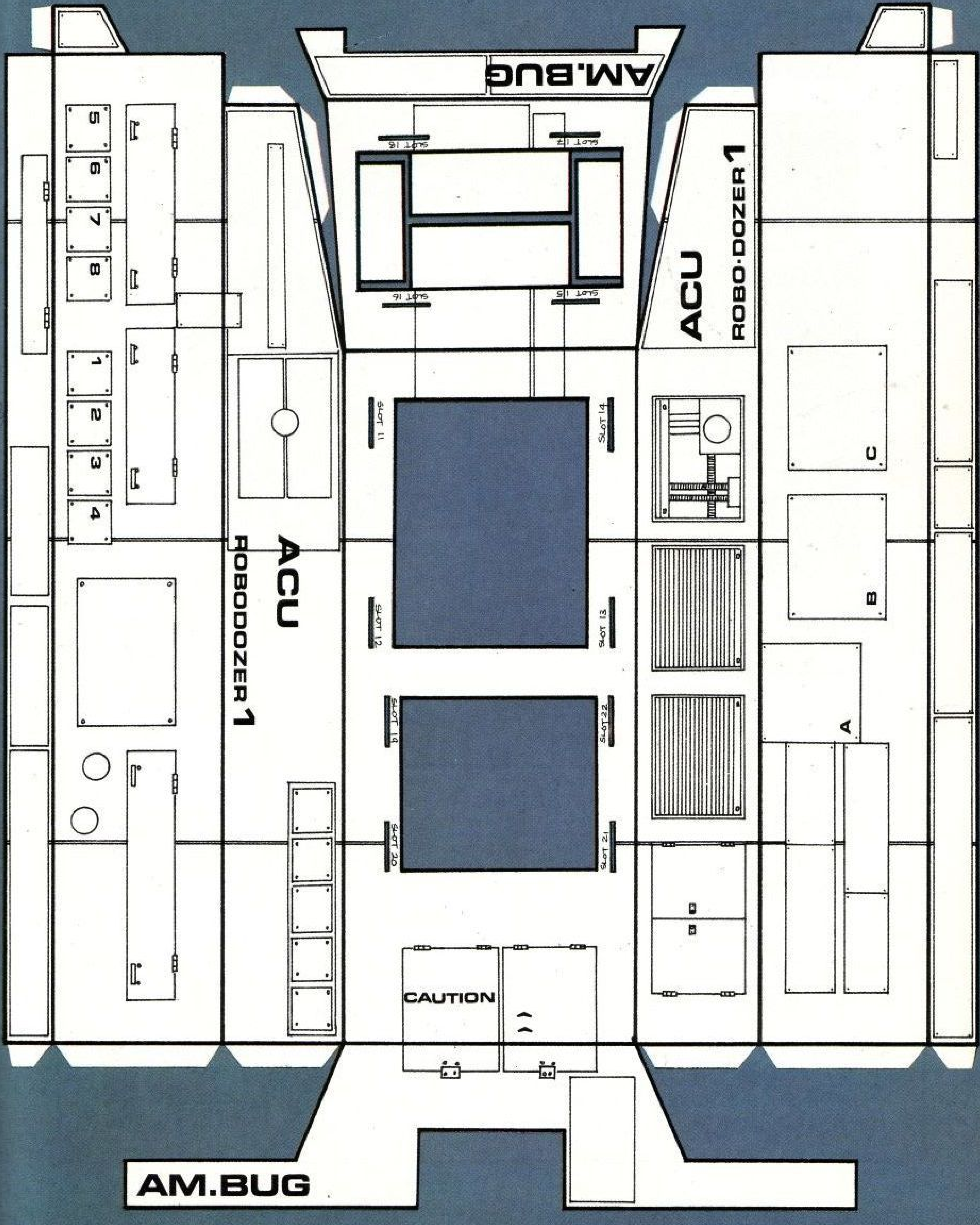


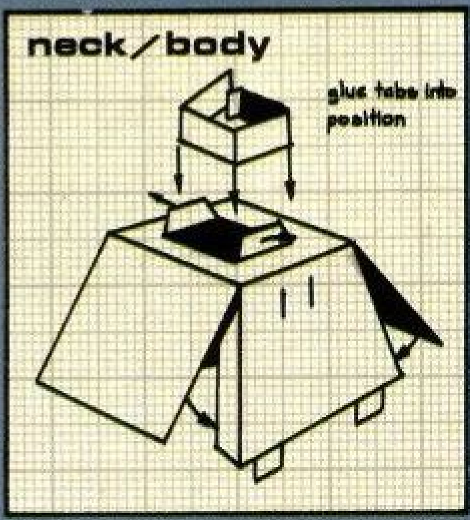


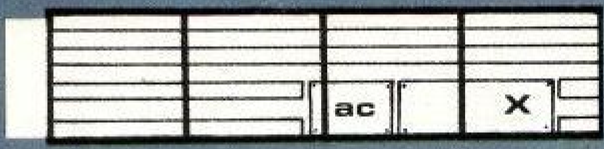


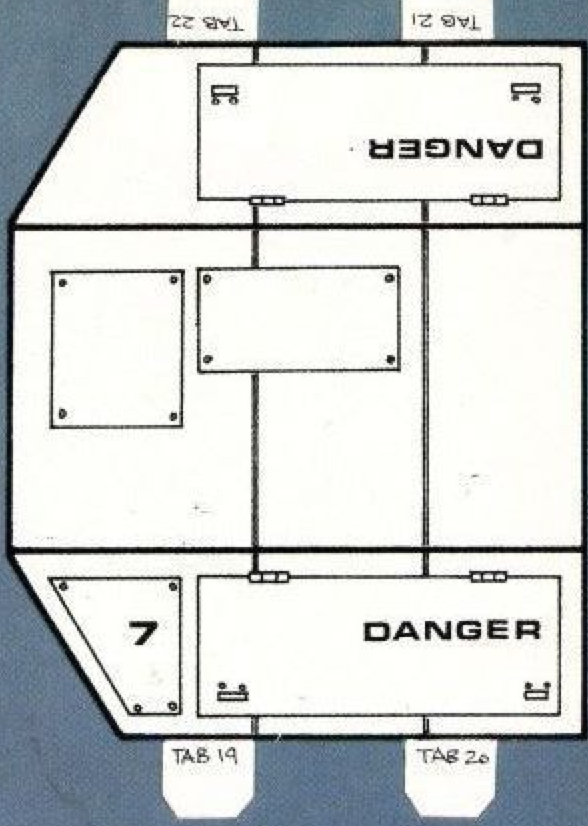
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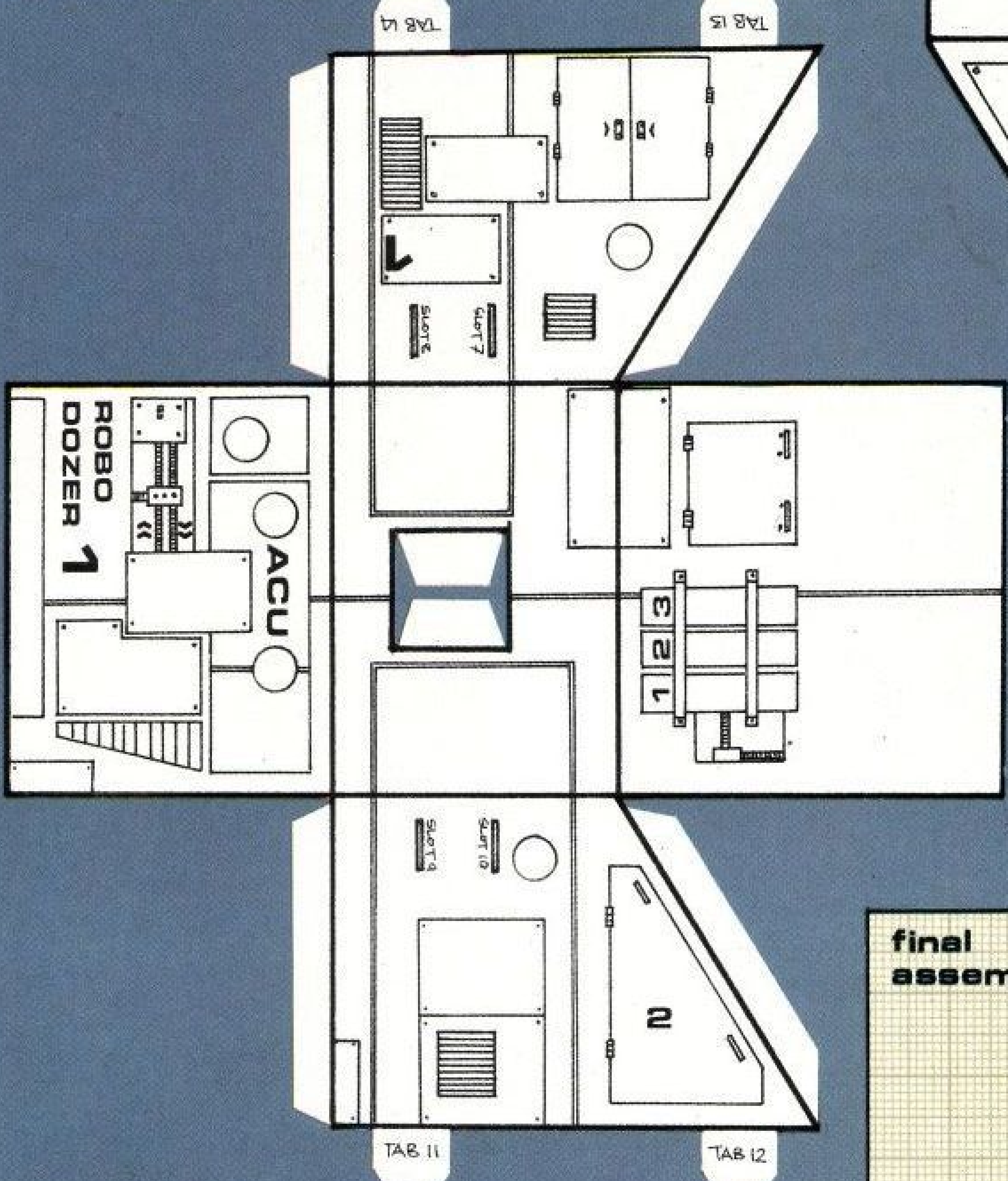
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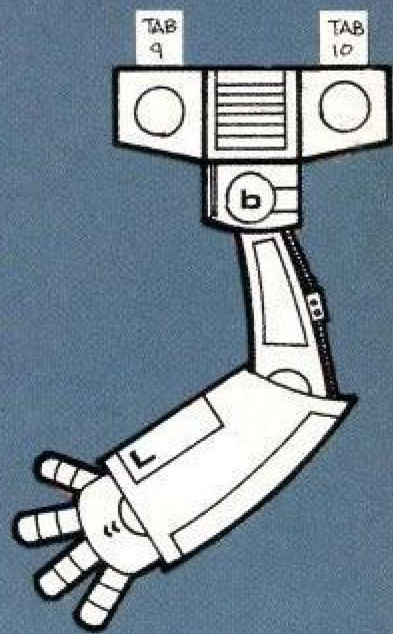


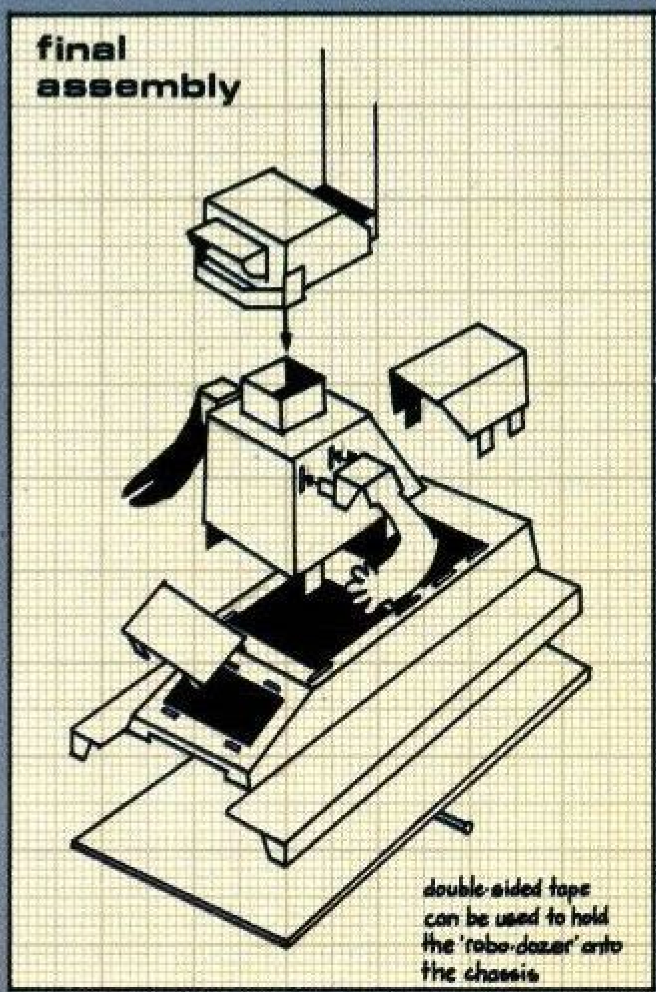


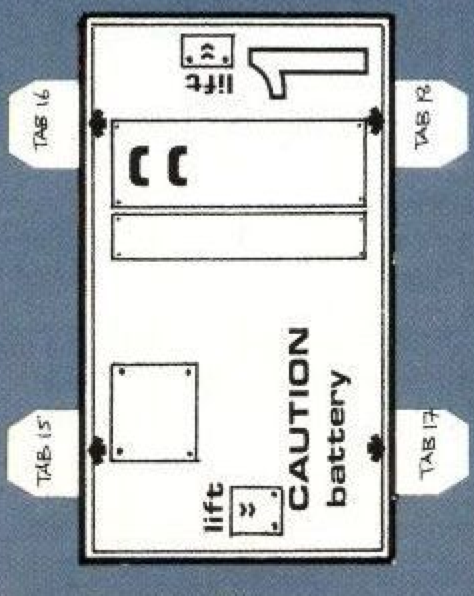


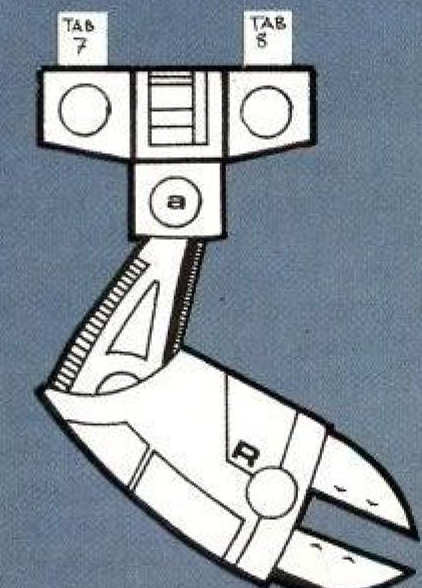






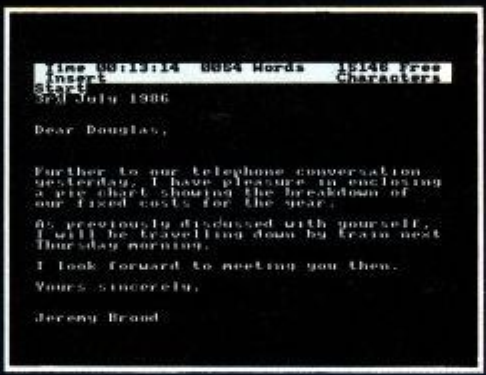




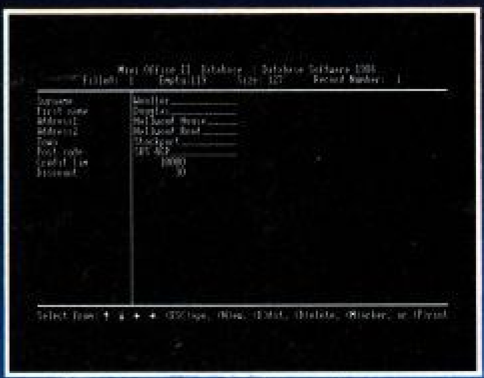


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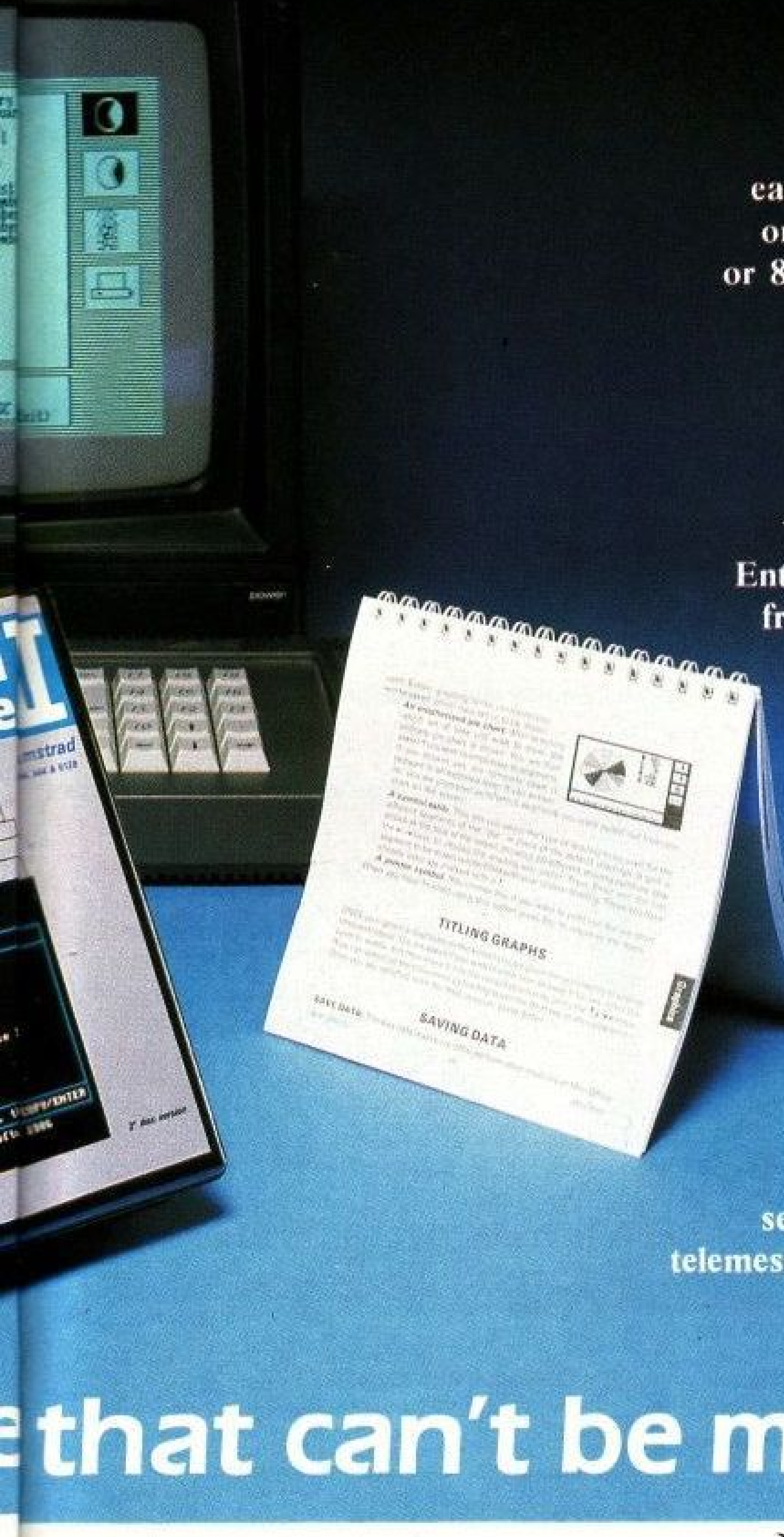
Yet possibly the best advertisement for Mini Office II is that it comes from the same stable that produced the original Mini Office package back in 1984.

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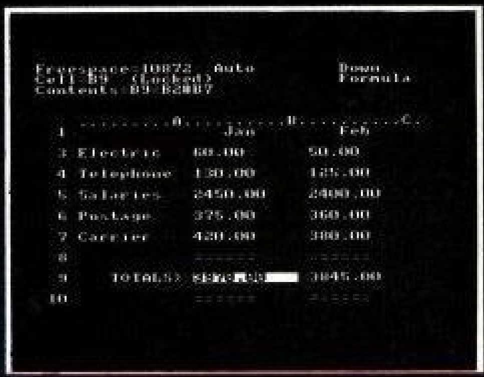
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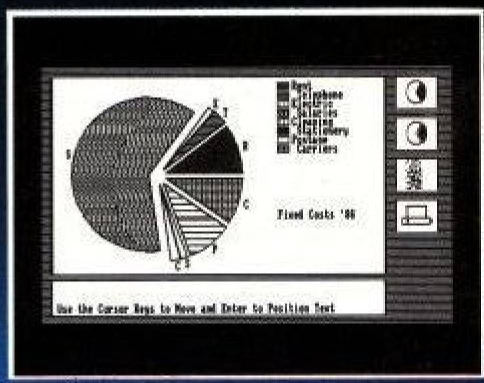
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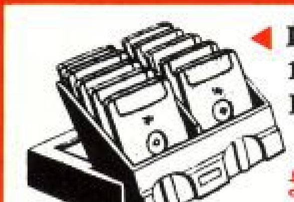
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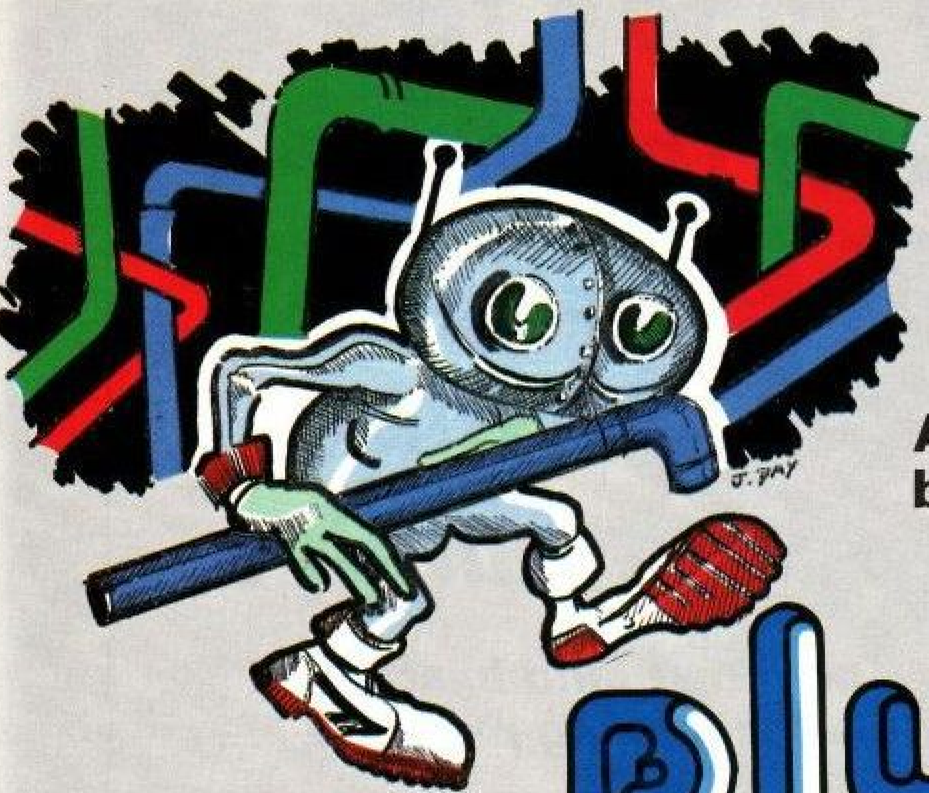
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plumber droid

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Avoid the roaming disruptor droid – any contact and it will be transported to the start position. This must be completed before the gases eat their way through the shell of the plumber craft.

You have the option of using joystick or keyboard.

This program creates its own machine code and checks for typing mistakes, but cannot check for some errors. If you get the message "Type mismatch in 2620" you have made a mistake in the DATA. By typing GOTO 2770 when you get the error you should get a rough idea of where the mistake is.

Have fun!

```
10 ' Pipeline Plumber                by K.Freeman
20 '
30 MODE 0
40 DEFINT a-z
50 SYMBOL AFTER 256:MEMORY &8FFF
60 SYMBOL AFTER 32
70 GOSUB 2730
110 MOVE 500,20:DRAWR 30,10
120 MOVE 500,20:DRAWR 30,-5
130 MOVE 514,7:DRAWR 0,25
140 PEN 8:LOCATE 6,10:PRINT "Pipeline
150 LOCATE 8,12:PRINT"Plumber
160 GOSUB 2580
170 DIM grid(20,12),start(20,12)
180 'position of disruptor
```

```
190 RESTORE 200:FOR t=1 TO 6:READ n,m:dx
    (t)=n:dy(t)=m:NEXT
200 DATA 17,7,14,3,15,11,10,5,6,4,14,5
210 FOR t=200 TO 60 STEP -1:SOUND 4,t,1,
    9:NEXT
220 'default control keys
230 up=0:dw=2:lf=1:rt=8:hv=47
240 GOSUB 680
250 scr=1:sc=0
260 SOUND 2,2000,7,13:MODE 0
270 BORDER 0
280 IF scr=1 THEN RESTORE 1790
290 IF scr=2 THEN RESTORE 1920
300 IF scr=3 THEN RESTORE 2050
310 IF scr=4 THEN RESTORE 2180
320 IF scr=5 THEN RESTORE 2310
330 IF scr=6 THEN RESTORE 2440
340 'show screen
350 l=0:q=0
```

```
360 FOR y=1 TO 12
370  READ n$
380  FOR x=1 TO 20
390   s=(ASC(MID$(n$,x,1)))-97
400    SPRITE,(x-1)*2,(y-1)*2,s
410   grid(x,y)=s:start(x,y)=s
420  NEXT x
430 NEXT y
440 FOR t=1 TO 1000:SOUND 1,t,1,9:SOUND
    2,1000-t,1,9:NEXT
450 'time left box
460 PLOT 370,0,2:DRAW 639,0
470 PLOT 370,10:DRAW 639,10
480 GOSUB 1580
490 GOSUB 1520
500 'variables
510 x=2:y=11:o=11:a=x:b=y
520 dx=dx(scr):dy=dy(scr):GOSUB 1130:da=
    dx:db=dy
```

```
530 grid(dx,dy)=17
540 w=370:hold=0
550 'keypress
560 IF INKEY(rt)=0 AND x<19 THEN px=1:py
    =0:s=11:GOTO 850
570 IF INKEY(lf)=0 AND x>1 THEN px=-1:py
    =0:s=12:GOTO 850
580 IF INKEY(up)=0 AND y>1 THEN px=0:py=
    -1:s=9:GOTO 850
590 IF INKEY(dw)=0 AND y<11 THEN px=0:py
    =1:s=10:GOTO 850
600 IF INKEY(71)=0 AND hold=1 THEN SOUND
    2,1000,2,,,5:GOSUB 1240
610 IF INKEY(63)=0 AND hold=0 THEN SOUND
    2,1500,3,,,8:GOSUB 1400
```

To order please use the form on Page 95



```
620 GOSUB 960
630 v=v+1:IF v=55 THEN GOSUB 1540
640 IF q=l THEN 780
650 IF w<639 THEN 560 ELSE GOSUB 660:GOT
    O 260
660 FOR t=2000 TO 1000 STEP -10:SOUND 1,
    t,1,7:NEXT:MODE 0
670 LOCATE 5,12:PEN 1:PRINT"Game over";
680 LOCATE 5,17:PEN 10:PRINT"P to play";
690 PEN 7
700 LOCATE 5,18:PRINT "C set Controls"
710 IF sc>h THEN h=sc
720 LOCATE 10,21:PEN 6:PRINT"Hi=";h
730 scr=1:sc=0
740 IF INKEY(27)=0 THEN RETURN
750 IF INKEY(62)=0 THEN GOSUB 3790
760 IF INKEY(46)=0 THEN END
770 GOTO 740
780 FOR t=60 TO 200:SOUND 4,t,1,10:NEXT
790 sc=sc+640-w:GOSUB 1520
800 scr=scr+1:IF scr<7 THEN 260
810 MODE 0
820 LOCATE 3,12:PEN 1:PRINT"game complet
    ed";
830 GOSUB 680:GOTO 260
840 'move/hover
850 SOUND 4,s12,5,5,,,1
860 GOSUB 960
870 IF INKEY(hv)=0 THEN IF s<>o GOTO 900
     ELSE 630
880 IF grid(x+px,y+py)>16 THEN x=x+px:y=
    y+py
890 IF a=x AND b=y AND o=s THEN 560
900  SPRITE,(a-1)*2,(b-1)*2,o
910  SPRITE,(x-1)*2,(y-1)*2,s
920 a=x:b=y:o=s
930 IF x=dx AND y=dy THEN GOSUB 1060
940 GOTO 630
950 'move disruptor
960 mv=mv+1:IF mv<3 THEN RETURN ELSE mv=
    0
970 gr=grid(dx+du,dy+dn)
980 SOUND 1,300,5,5:SOUND 4,200,3,3
990 IF gr<16 THEN 1130 ELSE dx=dx+du:dy=
    dy+dn
1000  SPRITE,(da-1)*2,(db-1)*2,14
1010  SPRITE,(dx-1)*2,(dy-1)*2,14
1020 da=dx:db=dy
1030 IF dx=x AND dy=y THEN 1060
1040 RETURN
1050 'disruptor contact
1060 FOR wt=100 TO 120:SOUND 4,wt,2,wt/1
    0:BORDER wt/5-10:NEXT
1070  SPRITE,(a-1)*2,(b-1)*2,o
1080 x=2:y=11:o=11:a=x:b=y
1090  SPRITE,(x-1)*2,(y-1)*2,o
1100 BORDER 0
1110 RETURN
1120 END
1130 r=RND*7+1
1140 ON r GOTO 1150,1160,1170,1180,1190,
    1200,1210,1220
1150 du=-1:dn=0:RETURN
1160 du=-1:dn=-1:RETURN
1170 du=1:dn=-1:RETURN
1180 du=1:dn=1:RETURN
1190 du=0:dn=-1:RETURN
1200 du=1:dn=0:RETURN
1210 du=-1:dn=1:RETURN
1220 du=0:dn=1:RETURN
1230 'drop pipe
1240 d=grid(x+px,y+py)
1250 IF d<17 THEN RETURN
1260 grid(x+px,y+py)=p
1270 hold=0
1280 IF start(x+px,y+py)<>p THEN 1360
1290 BORDER 6:INK 0,6
1300 FOR wt=1 TO 50:NEXT
1310 SOUND 1,1000,5,14
1320 BORDER 0:INK 0,0
1330 q=q+1:GOSUB 1500
1340 sc=sc+1:GOSUB 1520
1350 'display/erase pipe
1360  SPRITE,(x+px-1)*2,(y+py-1)*2,p
1370  SPRITE,38,22,p
1380 RETURN
1390 'pick up pipe
1400 p=grid(x+px,y+py)
1410 IF p>5 THEN RETURN
1420 grid(x+px,y+py)=17
1430 hold=1
1440 IF start(x+px,y+py)<>p THEN 1360
1450 SOUND 1,3000,5,14
1460 q=q-1:GOSUB 1500
1470 sc=sc-1:GOSUB 1520
1480 GOTO 1360 'jump to erase/display pi
    pe
1490 'no. connected
1500 LOCATE 9,25:PEN 7:PRINT q;
1510 RETURN
1520 LOCATE 1,25:PEN 3:PRINT sc;
1530 RETURN
1540 w=w+3:v=0
1550 MOVE w,2:DRAW w,9,12
1560 RETURN
1570 ' move pipeline
1580 FOR y=1 TO 12
1590  FOR x=1 TO 20
1600   IF start(x,y)<6 THEN GOSUB 1650
1610  NEXT x
1620 NEXT y
1630 GOSUB 1500
1640 RETURN
1650 p=grid(x,y)
1660 grid(x,y)=17
1670 l=l+1
1680  SPRITE,(x-1)*2,(y-1)*2,p
1690 a=RND*19+1:b=RND*11+1
1700 IF grid(a,b)<>17 THEN 1690
1710 IF start(a,b)=p THEN 1690
1720 grid(a,b)=p
1730  SPRITE,(a-1)*2,(b-1)*2,p
1740 SOUND 2,500,2,6
1750 LOCATE 6,25:PEN 10:PRINT l;
1760 RETURN
1770 ' data for screens
1780 'screen 1
1790 DATA hhiiiihssssssssshhihh
1800 DATA hrrrrhhiiiisiihrrih
1810 DATA iibddfrrrrhiihrrrri
1820 DATA inahharrrrhhhrrrbgri
1830 DATA iechharhrrhrrrrarri
1840 DATA irrrharhrrrrbdddcrri
1850 DATA irrrrarhhrrarrorri
1860 DATA irrrrarhhhrrahhrrrri
1870 DATA irrrredddddchrrrrih
1880 DATA hsirrrrrrrhhhhrrrihh
1890 DATA hlhrrrrrrrrrrrrrhss
1900 DATA hhhhiiiiiiiiiiiiiihhss
1910 'screen 2
1920 DATA iinhhssshhiiiiiissss
1930 DATA irarrhshrrrrhirhhhhh
1940 DATA hrefriiiirrhrorirrrh
1950 DATA hhrarhhrrrhrrrrirrri
1960 DATA sirarhrbddddfirhbdgi
1970 DATA sirarhrarhhraihharri
1980 DATA hiredddcrhrrairrarii
1990 DATA irrrrhrrrrrraihbciii
2000 DATA irrrhhrrrrrrabdcrrri
```

```
2010 DATA ishhhrrriiiraahhrhii
2020 DATA ilhrrrriisirecrrriss
2030 DATA iiiiiiiissiiiiiiiiss
2040 'screen 3
2050 DATA ssiiiiiissiiiiiihhhh
2060 DATA sshhrrrissirrhhrrrrh
2070 DATA ihhrrrrnisirbddddfri
2080 DATA irrrbddcishrahhhrahi
2090 DATA irrhahhhihhrahhrrari
2100 DATA ihhreddddddcbdddcri
2110 DATA irrrrrrrrrhrrarrhhri
2120 DATA irrrrbfrrrhrrarrhrri
2130 DATA irrrhaedddddcrrhrri
2140 DATA hshrhegrrhrhrrrrhiii
2150 DATA hlhrhhrrrhihrrorhiss
2160 DATA hhhhiiiiiiiiiiiihhiss
2170 'screen 4
2180 DATA sssshhiiiiiiiinihiihh
2190 DATA sssshrbdddfhharhrrrh
2200 DATA ssssirarrrahrarhhhri
2210 DATA ssiirrahhreddcrrrhri
2220 DATA sshhhbcrhorbddfrrrri
2230 DATA ssihhefhhrrefrarrhri
2240 DATA hiirrrahbfrrarahhrri
2250 DATA irrrhhahaahrabchhrri
2260 DATA irrrhharaahhaegrhrri
2270 DATA ishiiredceddcrrrriii
2280 DATA ilhhirrrrhhhrrrrhiss
2290 DATA ihhiiiiiiiiiiihhhiiss
2300 'screen 5
2310 DATA siiiiihhhhiiiiihiihhs
2320 DATA ihhhrrrhrbddfrhrrrhs
2330 DATA irhbddfhharrahirhris
2340 DATA irbcroanhahreddfiiih
2350 DATA ihefrraahahrrhrarrhi
2360 DATA siharraedchrrhrefrri
2370 DATA ssharrarhhhhrrhhahri
2380 DATA hhhegrefhrrhrrrbcrrh
2390 DATA irrrrrredfrhrrrahhhh
2400 DATA ishrrrrhheddddddchhii
2410 DATA ilhrrrrrrrrrrrrrrrhss
2420 DATA iihhiiiiiiiiiiiiihhss
2430 'screen 6
2440 DATA iiiiihhiiiiiiiihnhiih
2450 DATA ihhrrriirirrrrheddfh
2460 DATA hnhrrrirrrrbddddddch
2470 DATA iarrrrhrhrrarrhriihh
2480 DATA iarrhhhhhrrarohrisss
2490 DATA iedddfbdddfarrhhhsss
2500 DATA irhhhaegrhecrrrrhiii
2510 DATA irhrrarrrhhhrrrrrrri
2520 DATA irhireddddddddfrrrri
2530 DATA hshirrrrrhhrrregriii
2540 DATA hlhihhhrrrrrrrrrrhss
2550 DATA hhhsssiiiiiiiiiiihhss
2560 'poke code into memory
2570 '        @ &9000-&9480
2580 RESTORE 2790:mem=&9000
2590 BORDER 0
2600 FOR dl=1 TO 96:READ d$,ck:rs=0
2610 FOR by=1 TO 24 STEP 2
2620 a=VAL("&"+MID$(d$,by,2))
2630 rs=rs+a
2640 POKE mem,a
2650 mem=mem+1
2660 NEXT by:IF rs<>ck THEN 2750
2670 SOUND 4,300,3,10
2680 IF ab=12 THEN ab=11 ELSE ab=12
2690 DRAWR 0,0,ab:MOVE dl*6,332:DRAWR -8
     ,18
2700 NEXT dl:CALL &9000
2710 RETURN
2720 'set pens
2730 RESTORE 3760
2740 FOR t=0 TO 15:READ k:INK t,k:NEXT:R
     ETURN
2750 SOUND 4,600,6,15:BORDER 6
2760 MODE 1:INK 0,1:INK 1,26
2770 PRINT"data error in line..";dl*10+2
     610
2780 END
2790 DATA 010E90210A90CDD1BCC90A90,1303
2800 DATA 0E901390C31A905350524954,1088
2810 DATA C500DD4602DD4E04DD7E00FE,1394
2820 DATA 10D0076F2600117090197E5F,899
2830 DATA 237EFEFFC85778FE19D0D504,1781
2840 DATA 11500021B0BF1910FDD179FE,1375
2850 DATA 28D007D55F160019D11A4713,935
2860 DATA 1A4F13C5E51AAE77231310F9,1188
2870 DATA E1010008093004015 0C009C1,770
2880 DATA 0D20E8C99090D29014915691,1516
2890 DATA 9891DA911C925E92A092E292,1752
2900 DATA 24936693A893EA933894FFFF,1842
2910 DATA 041000736F0000736F000073,587
2920 DATA 6F0000736F0000736F000073,678
2930 DATA 6F0000736F0000736F000073,678
2940 DATA 6F0000736F0000736F000073,678
2950 DATA 6F0000736F0000736F000073,678
2960 DATA 6F0000736F00041000000000,357
2970 DATA 000000000000000000000000,0
2980 DATA 00113333003333330073F3F3,873
2990 DATA 0073F3F300733F3F00733F3F,1083
3000 DATA 00736FCF00736FCF00736F00,1092
3010 DATA 00736F0000736F0000736F00,678
3020 DATA 041000736F0000736F000073,587
3030 DATA 6F0000736F0033736F003373,780
3040 DATA 6F00F3F36F00F3F36F003F3F,1431
3050 DATA 6F003F3F6F00CFCFCF00CFCF,1383
3060 DATA 8A0000000000000000000000,138
3070 DATA 000000000000041000000000,20
3080 DATA 000000000000000000000000,0
3090 DATA 3333333333333333F3F3F3F3,1380
3100 DATA F3F3F3F33F3F3F3F3F3F3F3F,1476
3110 DATA CFCFCFCFCFCFCFCF00000000,1656
3120 DATA 000000000000000000000000,0
3130 DATA 041000736F0000736F000073,587
3140 DATA 6F0000736F0000736FCF0073,885
3150 DATA 6FCF00733F3F00733F3F0073,915
3160 DATA F3F30073F3F300333333 0033,1291
3170 DATA 333000000000000000000000,102
3180 DATA 000000000000041000000000,20
3190 DATA 000000000000000000000000,0
3200 DATA 33333300333333 00F3F3B300,971
3210 DATA F3F3B3003F3FB3003F3FB300,1275
3220 DATA CF9FB300CF9FB300009FB300,1428
3230 DATA 009FB300009FB300009FB300,1014
3240 DATA 04100051AACF0055E7DB0055,1098
3250 DATA 22A200005500220077003345,554
3260 DATA E7AAB3153322F3739BA23F73,1539
3270 DATA 9BA26FB39BA2CF339BA29B67,1757
3280 DATA CF73459B4573453345DB0022,1172
3290 DATA 45CF000051CF0410030F1E3C,692
3300 DATA 030F1E3C57FFFFBE570F1EBE,1217
3310 DATA 570F1EBE57FFFFBE030F1E3C,1217
3320 DATA 57FFFFBE030F1E3C57FFFFBE,1682
3330 DATA 570F1EBE570F1EBE57FFFFBE,1431
3340 DATA 030F1E3C57FFFFBE030F1E3C,1003
3350 DATA 0410CCD0D0FFCCD0D0FF9C3C,1986
3360 DATA 3C7D9CD0D07D9CD0D07D9C3C,1795
3370 DATA 3C7DCCD0D0F5CCD0D0F59C3C,2131
3380 DATA 3C7DCCD0D0F5CCD0D0F59C3C,2131
3390 DATA 3C7D9CD0D07D9CD0D07D9C3C,1795
3400 DATA 3C7DCCD0D0FF041000281400,1140
3410 DATA 002814000002010000020100,66
3420 DATA 00F4780000F4780045FCBC8A,1375
3430 DATA 45FCBC8A453C3C8A453C3C8A,1301
3440 DATA 459E6D8A459E6D8A00458A00,1155
3450 DATA 00458A000000000000000000,207
3460 DATA 041000000000000000000045,89
3470 DATA 8A0000458A00459E6D8A459E,1046
3480 DATA 6D8A453C3C8A453C3C8A45FC,1222
3490 DATA BC8A45FCBC8A00F4780000F4,1581
3500 DATA 780000020100000201000028,166
3510 DATA 140000281400041000000000,100
3520 DATA 0000000000CF8A0000CF8A00,690
3530 DATA 009EF816009EF816453CFC00,1237
3540 DATA 453CFC00453CBC00453CBC00,1015
3550 DATA 009E7816009E781600CF8A00,945
3560 DATA 00CF8A000000000000000000,345
3570 DATA 041000000000000000000045,89
3580 DATA CF000045CF0029F46D0029F4,1162
3590 DATA 6D0000FC3C8A00FC3C8A007C,1133
3600 DATA 3C8A007C3C8A29B46D0029B4,1071
3610 DATA 6D000045CF000045CF000000,661
3620 DATA 000000000000410C3C3C3C3,800
3630 DATA C3C3C3C312736F8112736F81,1526
3640 DATA C3FFAFC312736F8112736F81,1566
3650 DATA C3FFAFC312736F8112736F81,1566
3660 DATA C3FFAFC312736F8112736F81,1566
3670 DATA 12736F8147736F8B47736F8B,1245
3680 DATA 000000000000000000000000,0
3690 DATA 04100000000015373F2A0000,201
3700 DATA 0000003F372A000000000000,160
3710 DATA 2A00003B3F00003B3F00003B,345
3720 DATA 3F00000000000000002A000011,122
3730 DATA 3F0000113F0000002A001537,261
3740 DATA 3F3F00152A00081800000000,221
3750 'pen colour
3760 DATA 0,24,19,21,25,9,6,15,16
3770 DATA 8,7,2,11,23,26,10
3780 'select keyboard/joystick
3790 PEN 1:MODE 1
3800 LOCATE 5,1:PRINT "Control"
3810 PEN 2:LOCATE 5,5:PRINT "j Joystick"
3820 PEN 3:LOCATE 5,7:PRINT "k Keyboard"
3830 PEN 1
3840 IF INKEY(37)=0 THEN 3870
3850 IF INKEY(45)=0 THEN 3940
3860 GOTO 3840
3870 rt=1:rt$="Cursor right"
3880 lf=8:lf$="Cursor left"
3890 up=0:up$="Cursor up"
3900 dw=2:dw$="Cursor down"
3910 hv=47:hv$="Space Bar"
3920 LOCATE 5,5:PRINT SPC(10);
3930 GOTO 4000
3940 rt=75:rt$="Joystick right"
3950 lf=74:lf$="Joystick left"
3960 up=72:up$="Joystick up"
3970 dw=73:dw$="Joystick down"
3980 hv=76:hv$="Fire"
3990 LOCATE 5,7:PRINT SPC(10);
4000 LOCATE 5,10:PRINT "right      ";rt$
4010 LOCATE 5,12:PRINT "left       ";lf$
4020 LOCATE 5,14:PRINT "up         ";up$
4030 LOCATE 5,16:PRINT "down       ";dw$
4040 LOCATE 5,18:PRINT "hover      ";hv$
4050 PEN 2
4060 LOCATE 5,20:PRINT "pick-up     X
4070 LOCATE 5,22:PRINT "drop        Z
4080 PEN 3:LOCATE 10,24:PRINT "p to play
     ";
4090 RETURN
```

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From the people who brought you Frank Bruno's Boxing, Space Harrier, Ikari Warriors and Bombjack, Jerry Muir brings you . . . The interview.

elite

If you draw up a league table of software houses, there's no question who the big boys are. Ocean and US Gold sit on high, churning out a mixture of resounding hits and the odd damp squib

But just under these giants lies a wealth of smaller companies who, far from being hidden by their shadows, are bright lights in their own right. They may be producing fewer games every year, but they've developed a reputation for consistent quality and house style.

In many ways it's more interesting to follow their fortunes than those of the apparently unshakable duo, because, as the proverb has it, mighty oaks from little acorns grow.

In fact a lot of software houses which are now household names began as very small acorns in the earliest days of home micros. Mikro-Gen copied arcade classics such as Centipede and Invaders; Hewson produced flight simulators; and the origins of Elite lie in a back-bedroom operation in the Midlands.

Second division?

Nowadays Elite is one of the most important of the "second division" companies, with a line of successful coin-op conversions to its name. But its rise has been gradual, hampered by occasional setbacks, and constantly enriched by a process of learning from its successes and failures, as company boss Steve Wilcox told me on my recent visit to the company's Walsall headquarters.

"Elite has been trading for two and a half years now. We started in September, 1984, as a completely self-financed software house. Before that I'd been involved as a retailer though, selling software and hardware since '83. It was just an opportunity that I spotted".

This route into the software industry contrasts with the origins of many of the smaller companies, which were founded by amateur hackers, working late into the night to produce their first, mail-order efforts. But though Steve trained as a chemist, the mysteries of coding weren't entirely alien to him.

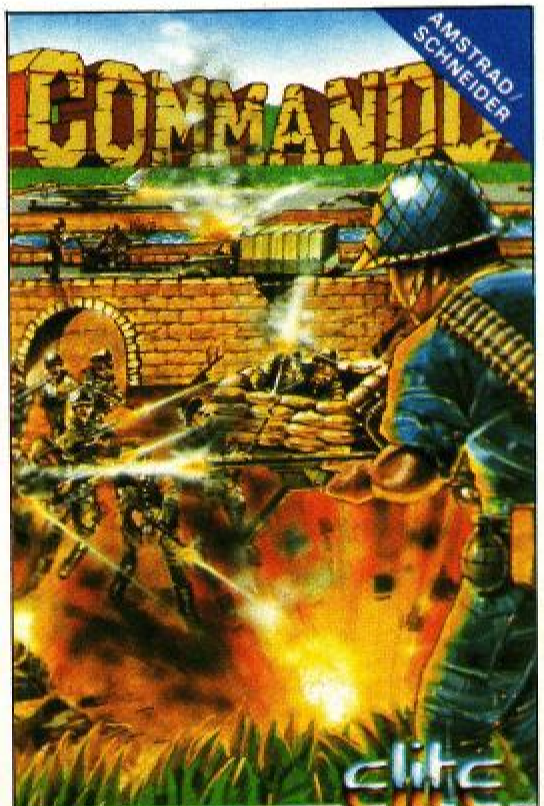
"My younger brother, Richard, put out a game called Blue Thunder.

"It was a straightforward back bedroom job. He wrote it while I was running the shop and got involved in putting the thing on the market.

"At that stage it was all very primitive, of course. Distributors were only just starting to operate. But it did well, and I decided that we should take on some more people to write some more products".

The first title to appear under the Elite banner was Kokotoni Wilf. "I don't know if you remember that?" Steve asks me. Indeed I do. This Jet Set Willy style game was a particular favourite of mine at the time.

There was nothing particularly revolutionary about the gameplay, apart from the fact that Wilf flew instead of running and jumping, but the humorous scenery, set throughout the history of the earth, was well drawn and amusing.



The game appeared on the Spectrum, but never made it to Arnold. I asked Steve why. "It was written for the Amstrad", he said, "but it wasn't particularly good, so we decided not to release it."

This concern about the quality of Elite programs is something that cropped up throughout our conversation. It's obviously very important to Steve to get things right. This has caused the delay in the release of the Amstrad Paperboy – the first version was scrapped when it failed to reach the mark.

So Elite started as what Steve calls the "typical thousand pounds finance job". Kokotoni Wilf sold fairly well. "Not a bad first effort", Steve says modestly. The next move was an ambitious one though. Elite was among the first companies to get involved in licensing TV shows.

Mixed reactions

"It was Ghostbusters that inspired us", Steve recalls. "Three or four months after the huge success of that game we recognised that there were other tie-ins that could be done and we went out and bought three at that stage – Fall Guy, Dukes of Hazard and the most successful of the three, Airwolf".

I can't help thinking he makes it sound like nipping down the market to buy five pounds of Kind Edwards.

Reactions to the first two tie-ins were rather mixed, though looking back at them, at least they resemble their originals, which is more than can be said for some recent tie-ins.

Airwolf wasn't without its controversial aspects either. A wall at the very start, which had to be shot away, made it difficult to get going. In retrospect, Steve reckons that this was a mistake,

but that if you persevered you faced a very reasonable game.

After these three programs Steve decided not to follow the path any further. "The image of these games got tainted fairly quickly, and it seemed to us that some of the added value of the license disappeared from the product. But that's not to say that we won't do them again".

Good sports

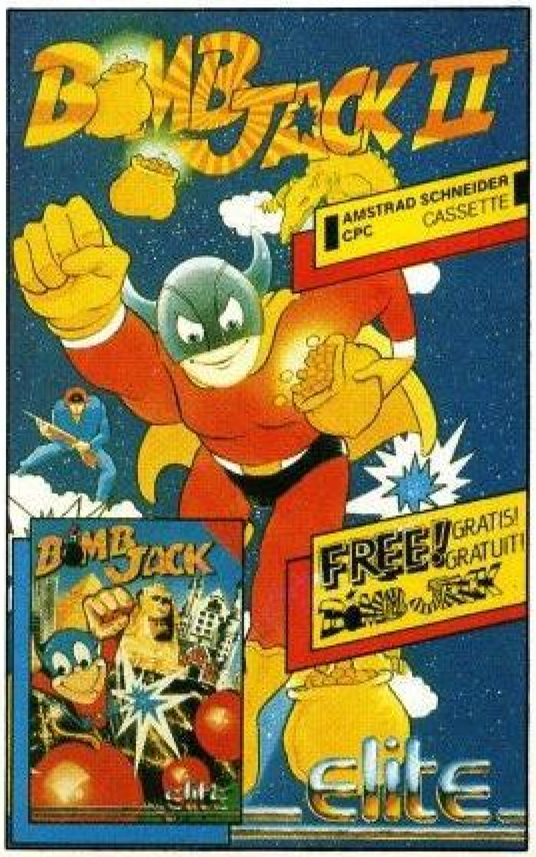
So Elite began to look around for something else, and for the next three programs they bought sporting names. First up was an official Grand National game which was well received but which failed to spark the public imagination.

Its sequel, a rally driving game linked to Dunlop tyres, re-used some of the programming ideas, but turned out to have a flat as far as critics and punters were concerned.

"There was a stage between the purely character merchandised product and getting involved with the coin-ops where, I freely confess, we got a little bit lost. We agonised for some time over Dukes of Hazard as to whether to actually release it.

"But I think that we learnt a lot at that stage about the necessity to get product right. We had a couple of things which were really quite disappointing. But we were a very young company and we didn't know much about the business".

That ignorance included how long it takes to produce a game – something that still causes a number of companies to trip up.



"That led to a product gap in the second quarter of '84. We'd made a decision at the start of the year that, rather than follow the trend to bang out as much product as possible, we'd go for the quality end. Which meant that between February or March and August '84, we didn't release anything".

But despite the resulting loss of cashflow, following a healthy Christmas period Elite was far from dead. Steve saw the real danger to the company not in terms of being forgotten, but in churning out bad product. A couple of projects were scrapped when they didn't make the grade.

The game that heralded the re-emergence of Elite was the third of their sporting tie-ins, Frank Bruno's Boxing. "We spent a long time developing it and there was a spate of boxing games, so we had to make the decision whether to rush it out.

"We took the longer term view and decided to develop it properly, wait the two months, and put out a good program". This philosophy worked, and Frank Bruno became micro champ immediately. He's still there, battling away, though looking rather queasy, on the Joyce.

There was another three month gap before the first game that was to launch the series for which Elite is probably best known, its coin-op conversions. Commando shot out of the arcades when Elite observed the success of titles such as Hypersports. But, as I pointed out to Steve, it's very easy to imitate the style of a machine without going to the expense of obtaining official permission.

"Yes", he agreed, "but the name is important. It's the only way you can produce a perfect copy of the game. There were a number of Commando clones out but the only way to do it properly is to take out a license".

Gut feelings

I was interested in how you go about choosing a machine from the arcades, then obtaining permission from its manufacturer. Steve's formula for success is to look for a degree of originality mixed with playability. "But it's a mixture of gut feeling and talking to people in the coin-op business", Steve explained.

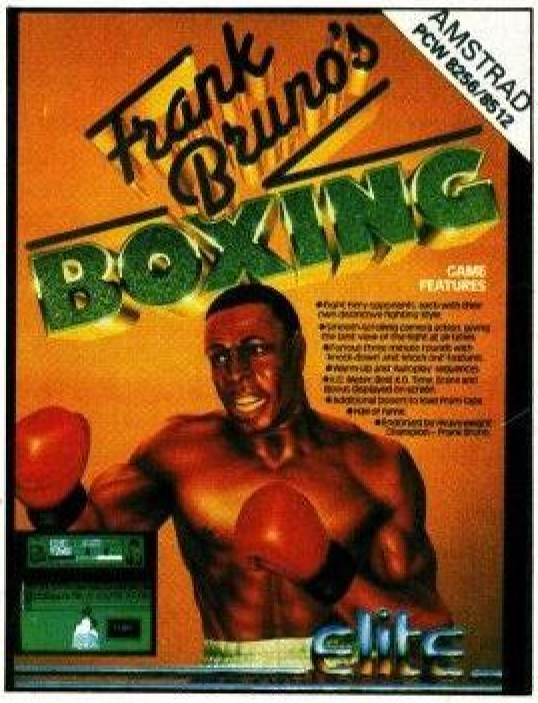
Coin ops are big business. There's even an annual trade fair at Olympia in London. Steve tells me that there's a lot of competition for the best titles. However he reckons that there are more machines than could be converted in a year, so the supply shouldn't dry up just yet. Elite has licensed games from eight or nine different publishers so far.

Once he's decided on his title the negotiations begin, and it can be an expensive business. "There are a number of significant interested parties, and it does force the prices up". Some of the companies have UK offices, but Steve can find himself dealing directly with the USA or even Japan.

Some companies are more concerned with how the conversion works out than others, but Elite always sends out demos as programming progresses and there is always the right of approval as an incentive to get things right.

Programmer education

That process is helped by making the programmers get to know the game, so one of Elite's first moves is to buy a machine and set it for free play. This can then be used by the people who will do the coding, so that they know every little detail – a job which sounds like heaven or hell, depending on your attitude to arcades.



While much of Elite's programming has been done on a freelance basis away from Walsall, one of the moves in '87 is to recruit a team of programmers, graphic artists and a musician. "Not a very large number to begin with, but we want people who can do the job properly".

But the program development houses will continue to play a vital role, and Elite frequently deals with three or four teams, plus individuals.

Once the team has taken the original to bits, they're in a position to submit a proposal to Elite, detailing what they think they can include in the game and how they intend to tackle its problems. Target dates are set, and after that

work in progress is submitted every two to three weeks.

Lack of computer training is no setback for Steve. He's absorbed enough information about what is and what isn't possible on the various micros. So when the prototype is evaluated back in Walsall it can be returned to the programmers with a report which details suggestions for alterations, whether they're major changes or mere fine tuning.

Development usually takes something over six months, but Elite hopes to have a finished version six weeks to two months before it appears into the shops. Bombjack II, which has only just appeared, was completed on two systems before Christmas.

It's not all coin-op conversions at Elite. Scooby Doo was a return to the tie-in formula. It also appeared long after it had been announced, and in a very different form to its original concept. I asked Steve why.

"We'd bought the license quite a time ago, in early '85", he said. Originally it was meant to be something akin to Dragon's Lair, with events in one episode shaping what happened next. "It was meant to play very similarly to that, but we ran into memory problems. At that stage we were very unsophisticated as far as program development was concerned".

So the project was re-designed, this time by the more than capable Gargoyle team, and Steve is now pleased with the product, though I detect a certain amount of regret that the original, ambitious and innovative idea never came to pass.

The one area where Elite was left with egg on its face in '86 was the £2.99 Classics range of budget re-releases. "We recognised that there was a section of the market that was growing. But I think, on reflection, that we didn't have the management capacity at that stage to administer the project. It was a lesson very well learnt, even if it was a rather embarrassing one".

However they've not given up on the idea of value for money software.

Following the success of last year's four program Hit Pack, this year will see a compilation from various sources, including Scooby Doo, Antiriad, Fighting Warrior, Split Personalities, 1942 and Jet Set Willy II – all for only £9.95.

1987 will also see a slight shift of emphasis from the coin-op conversions. In fact the year's first release, Bombjack II, is half way to being an original.

Instead of just having to collect the bombs, Jack now has to get them in order. And the nasties have become more vicious, metamorphosing into tougher threats the longer he leaves them. The only way to deal with them is to push them off the ledges. New backdrops range from Sydney Opera House to Stonehenge.

Future plans

Out of the 12 titles that Elite plans to release in the year – the limit of the company's programming resources, according to Steve – four or thereabouts will be wholly or semi-original.

These could include licenses, because Elite owns some tie-ins which they plan to sit on for a while. "But we're not willing to do what some of our competitors do", Steve says, in uncompromising tones, "and buy up 25 properties then put them out, even if they are crap".

Elite now boasts 14 permanent staff, spread over two floors. The only problem that I can see with their premises is that the warehouse space is on the first floor and there's no lift. This means that Scott and Mark, whose realm is the stockroom, have to shift as many as 150 parcels a day up and down the stairs.

But constant movement of product is important, and the newly computerised system ensures that there is a fast turnover to suppliers.

"It's a very tight little operation", Steve says. "Overheads are very small". But with a turnover of around £3 million last year, it's become necessary to take on a couple more administrative staff, if only to ease the burden on Steve's father, Brian, who has handled this side from the start.

Elite's growth, based on quality, will be an organic affair, not a sudden flash in the pan though.

Looking forward to the next year, Steve is quite happy about the position of the Amstrad. "It's an important machine to us. It's also a machine that we're able to produce some extremely pleasant games on, so we like it in that respect too". He quotes Ikari Warriors as a good example of Arnold's capabilities.

Amstrad software is also doing its bit for the export drive. It's very popular in France and Germany, where Elite has subsidiary companies, and in January foreign sales exceeded UK figures.

But Steve laments the cost of discs, which he claims makes a market for disc based software economically unviable in the UK at least.

One of the big questions for the coming year is whether games consoles will take a bite out of the computer market. Steve thinks that they'll complement each other, but reckons that the pricing structure at the moment is all wrong.

"We wouldn't publish a game for these machines if it has to sell for £15 or £20 a piece. It's going to depend on those prices".

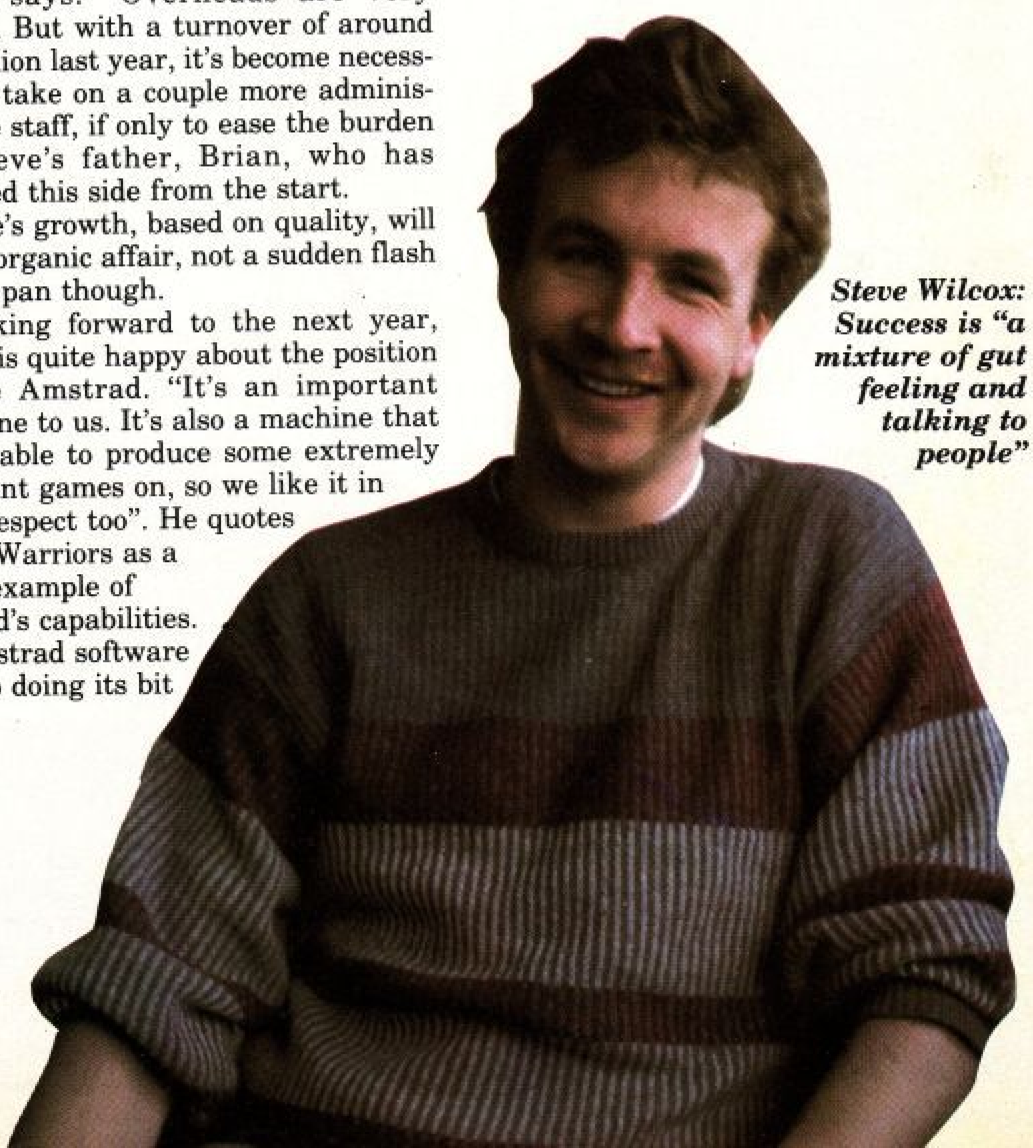
Finally I ask Steve about his plans for games for the PCW and PC.

In both cases he says that any moves would be "toe in the water operations'.

So while you shouldn't be surprised by an equally green successor to Frank Bruno, or the Elite logo on a 5¼in disc, you can be sure that Steve and his team will have looked long and hard at the potential market before playing their best shot.

You don't get rich by ripping off the customers or throwing money around. Caution is the way you join the Elite.

ACU



Steve Wilcox: Success is "a mixture of gut feeling and talking to people"

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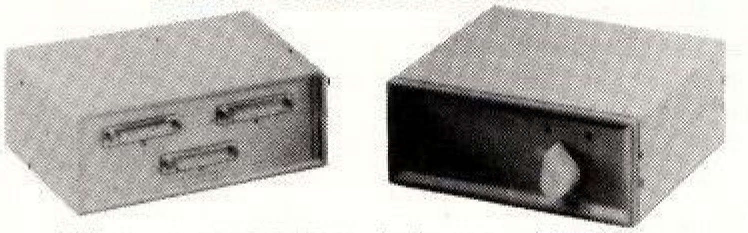
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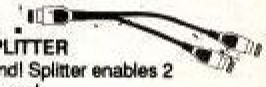
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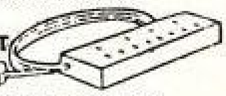
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Pushin' an' poppin' round the stack

For those people who have not had their fill of machine code, Peter Green fearlessly discusses the joy of stacks

In virtually any machine code routine you see published there will be a number of program lines using the PUSH and POP instructions. People who have only programmed in Basic may not have come across these terms as there are no Basic keyword equivalents. However, Basic does use them in a hidden way, as you'll see in a moment.

PUSH and POP are used to manipulate data on a type of structure called a stack, which is simply a list of numbers stored in the computer's memory, but which can only be "got at" in a special way. The analogy usually made – and who am I to break with tradition? – is of a stack of plates.

You can add (PUSH) plates on to the top of the stack, and later remove (POP) them off again, but the first plate you POP off must obviously be the last one you PUSHed on. You can't get at the plates further down the stack until the ones higher up have been removed. This is why stacks are also known as Last-In First-Out (LIFO) buffers.

What kind of jobs can we do with a stack? Basic uses one to keep track of the return addresses of GOSUBs. Remember that in Basic, subroutines can be nested; that is, one subroutine can call another, which can call yet another and so on. All the GOSUBs are ended by the same command, Return, and yet each time the return is made to the correct place in the program.

What Basic does, when it finds a GOSUB command, is to PUSH the address of the next command onto a stack, and then go to the subroutine. When it finds a Return, Basic POPs whatever is on the top of stack and uses that as the return address. So each Return goes back to the most recently-called GOSUB; the stack structure automatically ensures the correct program flow.

Since computers don't have an infinite amount of memory, PUSHing without POPping will eventually fill the stack. That's why there's a limit to the depth that subroutines may be nested – about 50 on the Amstrad ("about" 50 because other functions may use some stack space, too).

On the Z80, as in any other microprocessor I know of, the programmer is provided with a "hardware stack", that is the stack function is built into the chip. Since we're dealing with numbers held in memory, not china plates on a table, we need a 16 bit pointer to keep track of the position of the top of the stack. This, not unreasonably, is called the stack pointer, and in op-code mnemonics which refer to it directly it is called SP. For example, the Z80 stack can be anywhere in the 64k address space, so to place the stack at &C000 you write:

```
LD SP,&C000
```

This is where the Amstrad firmware, and most applications, initialise the stack pointer. Now alert readers will be saying "Wait a minute! The Amstrad screen memory starts at &C000. Using the stack will corrupt the screen".

Well, if the stack behaved like our china plates and grew upwards, you'd be right. Luckily, as numbers are added to the stack its top moves downwards in memory. We say that the stack "grows downwards", so that when a number is PUSHed, SP decreases, and when a number is POPped, SP increases.

This is not just bloody-mindedness on the part of the chip designers. Since the program instructions start in low memory and run upwards, if the stack starts in high memory and runs downwards you minimise the risk that they will try to use the same memory, corrupting either the program or the stack contents and crashing the machine.

Use and abuse

So what is the Z80 stack used for? The most obvious answer is for storing subroutine return addresses, just like Basic. Whenever you CALL a routine, the address of the next instruction after the CALL is automatically PUSHed on to the stack, and the Z80 jumps to the routine.

When a RET is executed, the return address is POPped off the stack and into the PC (program counter) register, and the program continues running at the instruction after the CALL.

However, the PUSH and POP instructions also allow the programmer to store any of the 16 bit register pairs on the stack and retrieve them later. As I've pointed out before in this series, in machine code the registers are heavily used, and data has to be continually moved in and out of them.

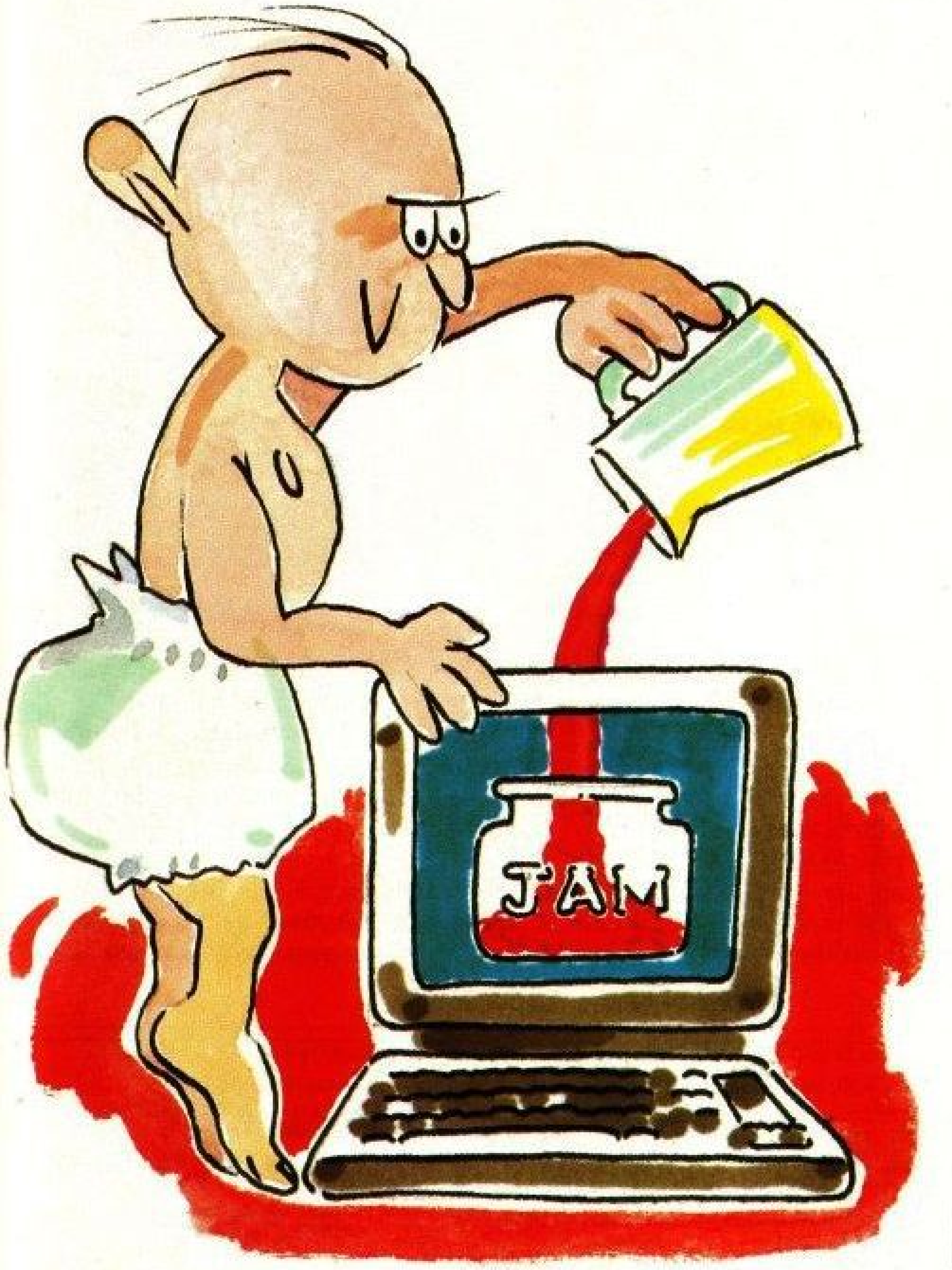
Values that need to be saved temporarily while a register is used for something else could be loaded directly into a memory and retrieved later, but such op-codes must include the memory address and use three or four bytes.

PUSH and POP automatically use SP as a memory pointer, so they need only one or two bytes, making the program smaller and faster.

You have to be careful how you use the stack, because mucking it up is easy to do, and always disastrous. For example, remember you can't PUSH a set of variables on to the stack, CALL a subroutine and then POP the values back off as parameters for the routine to use.

The first thing you POP will be the return address that the CALL placed *on top of your* data, so the subroutine will be working on the wrong numbers and has also thrown away its correct return address. This is a common mistake among machine code beginners (it took me ages to stop doing it!).

Another point is that when using the stack to store temporarily register values that a CALLed subroutine would otherwise corrupt (we do this a lot in the example program this month), the registers must be POPped off in the reverse order that they were PUSHed remember LIFO! Get into the




```
background_colour=TESTR(Ø,Ø)
IF background_colour=fill_colour THEN RETURN

LET graphics_foreground_colour=fill_colour
dx=2↑(2-mode)
stack_pointer=-1
PUSH start_x:PUSH start_y

WHILE1 stack_pointer>-1
  POP y:POP x
  MOVE x,y

  WHILE2 TESTR(dx,Ø)=background_colour AND x+dx<64Ø
    x=x+dx
    WEND2

  top=1:bottom=1

  MOVE x,y

  WHILE3 TESTR(Ø,Ø)=background_colour AND x>-1
    PLOT x,y
    LET test_colour=TESTR(Ø,2)
    IF y>396 THEN top=Ø
    IF test_colour<>background_colour THEN top=1
      ELSE IF top=1 THEN PUSH x:PUSH y+2:top=Ø

    LET test_colour=TESTR(Ø,-4)
    IF y<2 THEN bottom=Ø
    IF test_colour<>background_colour THEN bottom=1
      ELSE IF bottom=1 THEN PUSH x:PUSH y-2:bottom=Ø

    x=x-dx
    MOVE x,y
    WEND3

 WEND1
```

habit of ordering such a sequence alphabetically, thus:

```
PUSH AF
PUSH BC
PUSH HL
CALL something-or-other
POP HL
POP BC
POP AF
```

That makes it easier to spot any silly errors when debugging. Some programmers use PUSH reverse-alphabetically and POP alphabetically. Well, there's no accounting for taste.

Of course, you might want to swap registers deliberately using the stack. The only op-code provided for a register swap is EX DE,HL, which puts the contents of register pair DE into HL and vice versa. But if you needed, say, the equivalent of EX DE,BC, then:

```
PUSH BC
PUSH DE
POP BC
POP DE
```

will do the trick. This is also the only (legal) way of copying values between the general register pairs (AF,BC,DE,HL) and the index registers (IX and IY). Again, both these techniques feature in the example listing.

Finally, there's no reason to limit yourself to the machine stack. A stack is just a block of memory, a top-of-stack address pointer and a defined rule for accessing the data. The Z80 has plenty of 16 bit registers, so why not use one to set up your own user stack for certain applications? You've guessed it – see the example listing!

Filling you in

The example program this month is an area fill based on an algorithm that guarantees every nook and cranny of a closed shape will be reached. It makes heavy use of the machine stack, mainly to preserve registers through CALLs to the Amstrad's graphics firmware routines (most of which corrupt most of the registers). It also sets up a user stack, with the IY register as a stack pointer, to store the screen coordinates of any unfilled areas it will need to process later.

Listing I is a description of the fill algorithm in pseudocode (that is, English-like but not corresponding exactly to any real programming language).

Listing II is the equivalent translation into Amstrad machine code. The pseudocode uses three WHILE-WEND loops which are not available in machine code, but there's nothing to stop us simulating them by using conditions and machine code GOTOs, that is JR and JP, in the right way.

Structured programming doesn't mean never using GOTO; it means using it properly. In machine code, GOTO and GOSUB are all we've got to work with.

To show how the loops translate into machine code, I've numbered them as WHILE1-WEND1, WHILE2-WEND2 and WHILE3-WEND3 in Listing I, with similar labels in Listing II.

If the colour of the starting point is the same as the required fill colour, the

routine quits immediately. Then the value dx is set up, which is the number of user coordinates/pixel in the x direction. This reduces the testing overhead on the lower resolution screens.

The algorithm works by treating a closed figure to be filled as a series of horizontal lines, each one pixel high. The routine moves to the extreme right hand end of a line segment, then moves to the left, filling the line pixel by pixel. As it goes, it also checks above and below, and if it finds a new, unfilled line segment (that is a pixel still in the background colour), it adds a coordinate from that segment to the user stack. The flags "top" and "bottom" are used to ensure that only one point (all we need) from each unfilled line segment is added to the stack, to avoid wasting stack space.

When the extreme left hand end of the line segment being filled is reached, the program POPs a new point off the user stack, moves to that coordinate and repeats the whole procedure.

The routine fills either as far as the first non-background colour in any direction or the edge of the screen. Note that the coordinates for the edges (0-639, 0-399) assume that the origin (point 0,0) is at the lower left hand corner of the screen. Use ORIGIN 0,0 or the machine code equivalent (GRA_SET_ORIGIN) if in doubt.

The fill is started by picking a point within the area to be filled and "priming" the user stack with that point. It finishes when the user stack is empty, that is all line segments within the boundary have been identified and filled.

The price to pay is speed, though. To guarantee not missing a point, every pixel in the figure is tested at least twice, and sometimes three or four times.

The user stack can't shrink indefinitely, because when it's empty we've finished filling. It can't grow indefinitely, because we test the user stack pointer and abort the PUSH if the stack is full. Since the stack can't escape from its fixed allocation of 256 bytes of memory, it doesn't matter much whether it grows up or down. So for variety, I've arranged for the user stack to grow upwards.

Also note that a single "push-user" stores the four bytes from DE and HL on the stack, whereas the machine stack stores two bytes (that's why all data storage on the stack is in register pairs like AF, BC and so on). You can tailor user stacks to suit your application.



As a stiff test, the demo in Listing II prints the words "Pan-galactic Gargleblaster" (the editor's favourite tipple), draws a box round them and fills the box. This example uses up about half the user stack space. If the stack should fill up, any further points are simply not added, so parts of the figure won't get filled.

```
ORG &8000

 TXT_OUTPUT            EQU &BB5A
 TXT_SET_CURSOR        EQU &BB75

 GRA_MOVE_ABSOLUTE     EQU &BBC0
 GRA_SET_PEN           EQU &BBDE
 GRA_PLOT_ABSOLUTE     EQU &BBEA
 GRA_TEST_ABSOLUTE     EQU &BBF0
 GRA_TEST_RELATIVE     EQU &BBF3
 GRA_LINE_RELATIVE     EQU &BBF9

 SCR_SET_MODE          EQU &BC0E
 SCR_GET_MODE          EQU &BC11


 LD A,1
 CALL SCR_SET_MODE     ;Set Mode 1 for demo
 LD HL,&0410
 CALL TXT_SET_CURSOR   ;Move text cursor to middle of screen
 LD HL,string
 CALL print            ;It seems I've heard that song before...

 LD A,2
 CALL GRA_SET_PEN      ;Set graphics pen colour (can't do this in BASIC!)

 LD DE,30
 LD HL,170
 CALL GRA_MOVE_ABSOLUTE  ;Move to top left hand corner of a box

 LD DE,450
 LD HL,0
 CALL GRA_LINE_RELATIVE
 LD DE,0
 LD HL,-36
 CALL GRA_LINE_RELATIVE
 LD DE,-450
 LD HL,0
 CALL GRA_LINE_RELATIVE
 LD DE,0
 LD HL,36
 CALL GRA_LINE_RELATIVE  ;Draw a box round the text

 LD A,3                ;Fill the box in PEN 3
 LD DE,34              ;Start x coord for fill (in user coords)
 LD HL,168             ;Start y coord for fill (in user coords)
 CALL fill             ;Fill the box
 RET                   ;and quit

.print
LD A,(HL)              ;Well, you all know how this one works by now
INC HL
OR A
RET Z
CALL txt_output
JR print

.string
TEXT "Pan-Galactic Gargleblaster",0

.fill
;------------------------------------------------
;Entry conditions: A=required fill colour
;                  DE=user x coord of start point
;                  HL=user y coord of start point
;Exit conditions:  All registers corrupt
;------------------------------------------------


PUSH AF                ;Save required fill colour
PUSH DE                ;Save fill start x coord
PUSH HL                ;Save fill start y coord
CALL GRA_TEST_ABSOLUTE ;LET A=colour at start position
LD IX,background_colour
LD (IX+0),A            ;Store background_colour
POP HL                 ;Restore fill start y coord
POP DE                 ;Restore fill start x coord
POP AF                 ;Restore fill colour
CP (IX+0)              ;Same as background?
RET Z                  ;Quit if same

CALL GRA_SET_PEN       ;LET graphics_foreground_colour=fill_colour

CALL SCR_GET_MODE      ;What mode are we in?
LD A,4                 ;dx is 4 for Mode 0
JR C,set_dx
LD A,2                 ;dx is 2 for Mode 1
JR Z,set_dx
LD A,1                 ;dx is 1 for Mode 2

.set_dx
LD (IX+1),A            ;Store dx ( = 2↑(2-mode))
LD IY,stack-1          ;LET stack_pointer=0
CALL push_user         ;PUSH start_x and start_y

.while1
```

```
PUSH IY
POP HL                     ;Copy user stack pointer to HL (via machine stack!)
LD DE,stack
OR A                       ;Clear the carry flag
SBC HL,DE
JP C,wend1                 ;Jump out of WHILE1 if stack_pointer=-1

LD H,(IY+0)
DEC IY
LD L,(IY+0)
DEC IY                     ;POP y
LD D,(IY+0)
DEC IY
LD E,(IY+0)
DEC IY                     ;POP x

PUSH DE                    ;Save x
PUSH HL                    ;Save y
CALL GRA_MOVE_ABSOLUTE     ;MOVE x,y
POP HL                     ;Restore y
POP DE                     ;Restore x

.while2
PUSH DE                    ;Save x
PUSH HL                    ;Save y
LD D,0
LD E,(IX+1,                ;DE = dx
PUSH DE                    ;Save dx
LD HL,0
CALL GRA_TEST_RELATIVE     ;A=TESTR(dx,0)
POP BC                     ;BC=dx
POP HL                     ;HL=y
POP DE                     ;DE=x
CP (IX+0)                  ;IF TESTR(dx,0)<>background_colour
JR NZ,wend2                ;THEN quit the while2 loop

EX DE,HL                   ;x to HL, y to DE
PUSH HL                    ;Save x
ADD HL,BC                  ;HL=x+dx
PUSH HL                    ;Save x+dx
LD BC,640
SBC HL,BC                  ;(The ADD will have cleared the carry flag)
POP BC                     ;BC=x+dx
POP HL                     ;HL=x
EX DE,HL                   ;Swap x and y into proper registers
JR NC,wend2                ;IF NOT (x+dx<640) THEN quit the while2 loop
LD D,B
LD E,C                     ;LET DE=x+dx
JR while2                  ;and loop back as per normal WHILE condition

.wend2                     ;Come here when WHILE2 conditions are FALSE
SET 1,(IX+2)               ;LET top=1
SET 0,(IX+2)               ;LET bottom=1

PUSH DE                    ;Save x
PUSH HL                    ;Save y
CALL GRA_MOVE_ABSOLUTE     ;MOVE x,y
POP HL                     ;Restore y
POP DE                     ;Restore x

.while3
PUSH DE                    ;Save x
PUSH HL                    ;Save y
LD DE,0                    ;Set relative x
LD HL,0                    ;and relative y to zero
CALL GRA_TEST_RELATIVE     ;LET A=colour at current cursor position
POP HL                     ;Restore y
POP DE                     ;Restore x
CP (IX+0)                  ;IF TESTR(0,0)<>background_colour
JP NZ,wend3                ;THEN quit while3 loop

BIT 7,D                    ;Has DE gone negative?
JP NZ,wend3                ;IF yes, THEN quit while3 loop

PUSH DE                    ;Save x
PUSH HL                    ;Save y
CALL GRA_PLOT_ABSOLUTE     ;PLOT x,y
LD DE,0                    ;Relative x
LD HL,2                    ;Relative y
CALL GRA_TEST_RELATIVE     ;LET A=TESTR(0,2)
POP BC                     ;LET BC=y
POP DE                     ;LET DE=x
LD HL,397
OR A
SBC HL,BC                  ;LET HL=397-y
LD H,B
LD L,C                     ;LET HL=BC=y
JR NC,not_top_line         ;IF y<398 THEN skip

RES 1,(IX+2)               ;otherwise set top=0

.not_top_line
CP (IX+0)                  ;IF test_colour=background_colour
JR Z,check_top             ;THEN check top
SET 1,(IX+2)               ;ELSE LET top=1
JR check_below             ;and skip over code for first IF TRUE

.check_top
BIT 1,(IX+2)
JR Z,check_below           ;IF NOT (top=1) THEN check line below

INC HL
INC HL                     ;ELSE LET HL=y+2
CALL push_user             ;Push x and y coords on user stack
DEC HL
DEC HL                     ;Restore old y
RES 1,(IX+2)               ;LET top=0

.check_below
PUSH DE                    ;Save x
PUSH HL                    ;Save y
LD DE,0                    ;Relative x
LD HL,-4                   ;Relative y
CALL GRA_TEST_RELATIVE     ;LET A=TESTR(0,-4)
POP HL                     ;Restore y
POP DE                     ;Restore x
LD BC,2
OR A                       ;Clear the carry flag
PUSH HL                    ;Save y
SBC HL,BC                  ;LET HL=y-2
POP HL                     ;Restore y
JR NC,not_bottom_line      ;IF y>1 THEN skip

RES 0,(IX+2)               ;ELSE LET bottom=0

.not_bottom_line
CP (IX+0)                  ;IF test_colour=background_colour
JR Z,check_bottom          ;THEN check bottom

SET 0,(IX+2)               ;ELSE LET bottom=1
JR move_left               ;and skip over code for first IF TRUE

.check_bottom
BIT 0,(IX+2)               ;IF NOT (bottom=1)
JR Z,move_left             ;THEN move cursor left

DEC HL
DEC HL                     ;ELSE LET HL=y-2
CALL push_user             ;Push x and y coords on user stack
INC HL
INC HL                     ;Restore old y
RES 0,(IX+2)               ;LET bottom=0

.move_left
EX DE,HL                   ;Move x to HL, y to DE
LD C,(IX+1)
LD B,0                     ;LET BC=dx
OR A
SBC HL,BC                  ;LET HL=x-dx
EX DE,HL                   ;Move x-dx to DE, y to HL

PUSH DE                    ;Save x
PUSH HL                    ;Save y
CALL GRA_MOVE_ABSOLUTE     ;MOVE x,y
POP HL                     ;Restore y
POP DE                     ;Restore x
JP while3                  ;Loop back as per normal WHILE construction

.wend3                     ;Come here when WHILE3 conditions are FALSE and
JP while1                  ;loop back as per normal WHILE construction

.wend1                     ;Come here when WHILE1 conditions are FALSE
RET                        ;and quit the FILL routine

.push_user
PUSH HL                    ;Save y
PUSH IY
POP HL                     ;Copy user stack pointer to HL
LD BC,stack+256-4          ;Make sure room for four bytes on 256-byte user stack
OR A                       ;Clear the carry flag
SBC HL,BC                  ;Do a 16-bit compare
POP HL                     ;Restore y
RET NC                     ;Quit if no room on stack

INC IY
LD (IY+0),E
INC IY
LD (IY+0),D                ;ELSE PUSH x on user stack
INC IY
LD (IY+0),L
INC IY
LD (IY+0),H                ;and PUSH y on user stack
RET

.background_colour         BYTE 0  ;Store background colour here
.dx                        BYTE 0  ;Store no. of user coords per pixel
.top_bottom                BYTE 0  ;Store two flags, top and bottom, in two bits
.stack                     RMEM 256 ;User stack for fill
```

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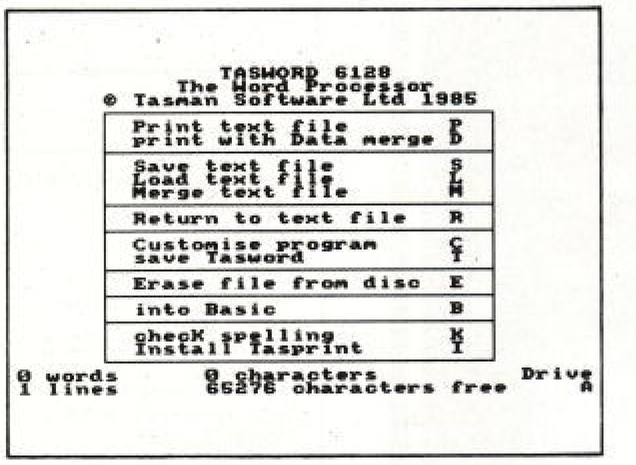
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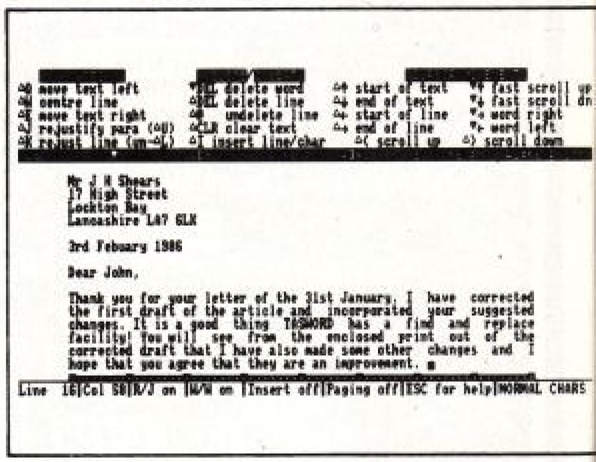
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THE WORD PROCESSOR

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POPULAR COMPUTING WEEKLY, NOVEMBER 1984

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TASCOPY 464
THE SCREEN COPIER

TASCOPY 464 cassette £9.90 disc £12.90

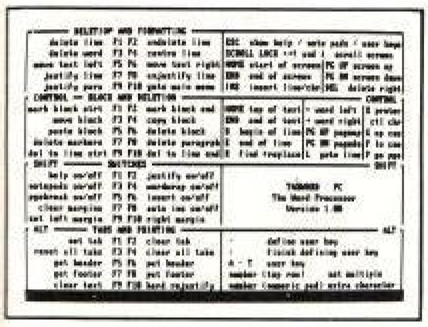
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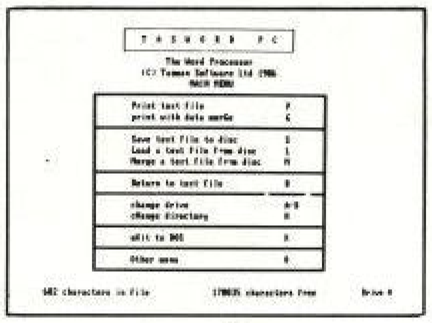
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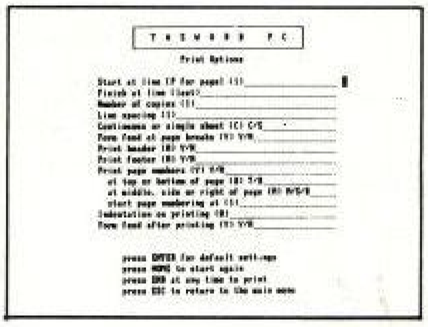
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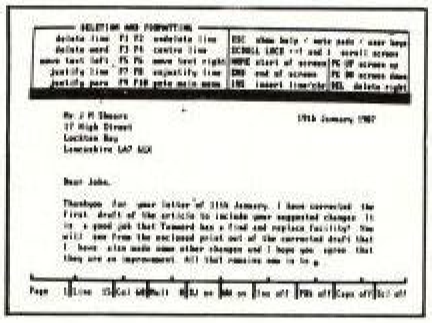
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produced by other programs. In addition, TASPRINT PC includes a font designer. You can use this extra facility to create your own personalised lettering styles and logos which you can then print using Tasprint!

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* Does not occupy any part of the Amstrad RAM and requires
* No additional software – has internal 8K ROM and 8K RAM.
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* MENU-DRIVEN, fully ERROR-TRAPPED with prompts and one-touch commands turning complex tasks into a trivial procedure – all you need to do is to push the button and select from the menu:
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* *MULTIFACE 2 is EXTREMELY FAST in both SAVING & RELOADING – its INTELLIGENT COMPRESSING and TURBO saving to disc/tape makes a standard 64K program reload typically in up to 20 SECONDS from disk or just over 5 minutes from tape. The most EFFICIENT COMPRESSING also results in minimal space used on disc or tape.*
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JUST COMPARE THE FACTS FROM AN INDEPENDENT TEST ON MICRONET:

MICRONET tested all four back-up devices currently on the market: *ACTION REPLAY* by Datel, *DISC WIZARD* by Evesham Micros, *IMAGER* by Mirage and *MULTIFACE 2* by Romantic Robot. They were all tested on the TOP 10 GAMES for the week ending January 1987. Each copier was tested at the same point in each game and in the event of a failure the reviewer tried twice more. These are some of the results:

Out of overall 100% success claimed, the actual percentage was:

ACTION REPLAY – 20%	DISC WIZARD – 40%	IMAGER – 50%	MULTIFACE – 100%

MULTIFACE was confirmed as the ONLY TRULY AUTOMATIC back-up device – all other copiers require manual setting of colour, screen mode, windows, etc. – provided they do not crash in the first place! This when tested on 10 games took altogether:

ACTION REPLAY – 15 mins	DISC WIZARD – over 175 mins	MIRAGE – over 66 mins	MULTIFACE – not applicable

The Actual SAVING time was in seconds:

ACTION REPLAY – 33.4	DISC WIZARD – 44.5	IMAGER – 36.6	MULTIFACE – 32.5

Naturally, you should add the SAVING time and the SETTING UP time together to get a true saving time per each game:

ACTION REPLAY – over 2 mins	DISC WIZARD – over 18 mins	MIRAGE – over 7 mins	MULTIFACE – 32.5 seconds

The loading time took on average in seconds:

ACTION REPLAY – 21.7	DISC WIZARD – 40.7	MIRAGE – 36.6	MULTIFACE – 19.7

Each device made a back-up of a different file size – on average:

ACTION REPLAY – 68K	DISC WIZARD – 89K	MIRAGE – 53K	MULTIFACE – 49K

The summary of the tests on MICRONET?

"MULTIFACE TWO from ROMANTIC ROBOT wins easily on all features! It is faster, more convenient, more successful, uses less space and has more facilities!"

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Empire - the thinking man's Elite



Simon Rockman joins the fight for the Federation

Empire is the new game from Firebird, and it will appeal to all megalomaniacs as you start with a small ship and work up to become master of your own empire.

It is a game of Elite-type proportions, and as with Elite you can progress by either fighting or trading. There are missions and medals, but the early part of the game centres on using pods.

The pods

Your cub ship is equipped with two tow ropes; these can be extended to carry pods, but must be withdrawn before you can dock. There are three basic types of pod – cargo, ship's extras and specials.

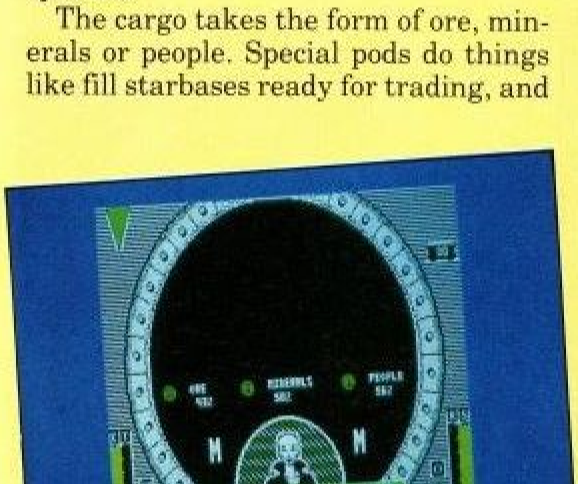
The cargo takes the form of ore, minerals or people. Special pods do things like fill starbases ready for trading, and there are energy pods which can be dropped to replenish shields and plague antidotes.

Most important are the ship's extras – the correct use of the right pod at the right time is the key to building the empire.

Ship's extras include a better laser, extra cargo ropes, a go-faster module, shield generators, hyperspace pods and galaxy jump pods.

Initially you can only carry two pods at a time, so it is important to earn the extra cargo ropes which allow a further two pods to be carried.

It is unfortunate that you cannot choose which pod to drop, but you need to withdraw the ropes until the pod you want to lose falls. This will certainly mean dropping two pods, and may mean dropping all four.



You are offered a mission. It's wise to accept it.

Starbases

You dock with starbases by flying between the two orbs and rotating so that the bow of your ship points to the centre of one globe and the stern to the centre of another.

This is quite a difficult skill to master, but as the programs' author, Andrew Glaister, remarked "it takes a week to learn to dock in Elite".

You cannot dock with your tow ropes extended, which means that you have to drop all your pods – ropes appear from the starbase and drag in the goodies.

The base will store ship's extras and add cargo to its deposits.

The starbase rewards your depositing of cargo by offering you more ship's extras as pods, and these drift outside the starbase for later collection.

When you have filled the ore, people and minerals categories – and freed the system of aliens and plague – you have the option to buy the starbase. This is the first step to building your Empire.

Bouncing into a starbase damages your shields, but you are safe from aliens if you are close enough to see the base. Wait outside for the shields to build up before trying to dock.

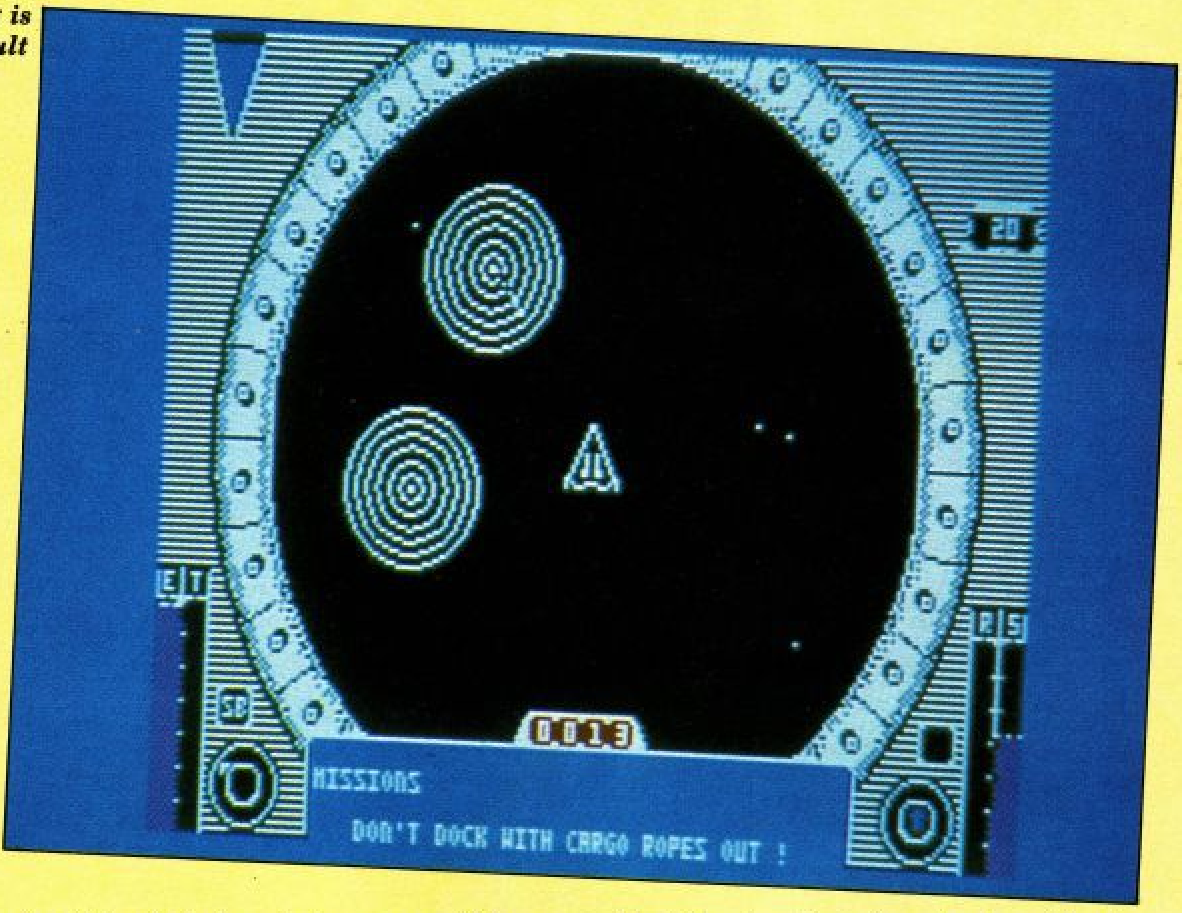
Improve yourself

Shortly after starting the game you will get the radio message 'The Empire will award medals for shooting lots of aliens'. This roughly translates to around 100 aliens for the first medal, 200 for the second, 800 for the third and 1500 for the fourth.

With the fourth medal you get a supership, fitted with all mod cons and capable of storing eight pods internally. It is with this craft that you set about your empire building.

This is a grand position to reach, starting from a humble cub ship without even a trading pass.

Winning your wings is essential, and you must prove your worth before the Empire will allow you to have a trading pass. This is done by rescuing a pod



Docking is difficult

which has been stolen by some aliens and returning it to the home starbase. Armed with a trading pod you should aim for a warp hole.

Planet bound

Most of Empire is played in 2D, but the planet sequence enters the third dimension. Re-entry on to a planet means finding a warp hole, which is shown on the system map as one pixel dots. Place a locator over the warp hole then use the ships pointer to fly there.

The glide slope is shown by series of rings, a bit like those in Dark Star or Hive. Missing the rings has an adverse effect on your shield and it takes quite some mastering before you can get on to the planet in one piece.

Once there your troubles are not over – green spiky fuzz balls come for you, then you can pick up the ore, people and mineral pods. Finally you head for an exit which takes you near the warp hole, where you can collect your booty and take it back to the starbase.

Be careful when carrying radioactive ore – it'll cause your ship to heat up with fatal consequences if you transport too much for too long. You should beware of making Icarus's mistake – flying too close to a sun will melt your ship and even getting close causes the laser to play up.

Having found your feet it is then time for some intergalactic travel. There are missions to perform in other solar systems and aliens to fight. The galactic map shows where you can fly to and unlike Elite you don't have to mess about with hyperspace to get there.

You can fly, but this is slow – a Galactic jump pod is the recommended mode of transport. Curing plagues and saving solar systems from aliens will toughen your fighting skills ready for the final hurdle of building a frontier. Then with the help of some frontier generators, you can box in your own bit of the galaxy and live happily ever after.

Opinion

Empire is an epic game and generally underrated – but it is difficult, perhaps too difficult.

It took me a while to master the first mission. You have to fly towards the aliens with your ropes out and hit the two escorts and the main alien before more enemy ships can appear. You can then swing the rope over the pod and leg it back to the starbase as quickly as possible. It is a good job that you can outrun the other ships.

The planet scene is spectacular and very different – it could well be another game. This change of pace left me breathless as I emerged from the warp hole.

The plot was devised by Fouad Katan and Andrew Glaister. Fouad wrote the Commodore 64 version, Andrew the Spectrum and Amstrad versions. They have been over ambitious: There is so much to know that you cannot simply sit down and have a blast – even getting past the initial stages is pretty tough.

There are some nifty programming tricks. The Empire logo bounces around on the title page and the whole game is played through a porthole. This helps to give the game a 50's Buck Rogers feel.

In some ways I get the impression that Empire is trying too hard to be different from Elite. There are more missions and a bigger goal but in many ways Empire could be classed with Elite, Space Trader and the old teletype Star Trek as a different space trading game.

The documentation is poor – an Elite/Starglider style novella would have been a worthwhile addition – and the sound is unimaginative. The disc version I tested required you to save your game to the supplied disc, something I was a little unsure of.

The game commits what one of my friends claims to be a sin – it starts in keyboard mode if you press the joystick fire button and doesn't document the key to leave the starbase.

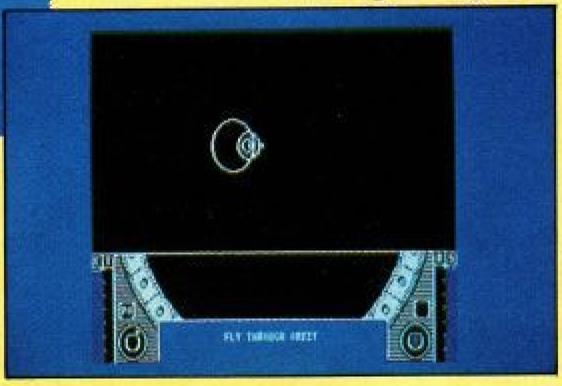
Yet for all these faults it is the game I have played most this month. Empire is curiously addictive, very frustrating and requires a bit of planning. The thinking man's Elite.

ACU



Local movements are planned on the system map

Entering a warp hole



The truth about

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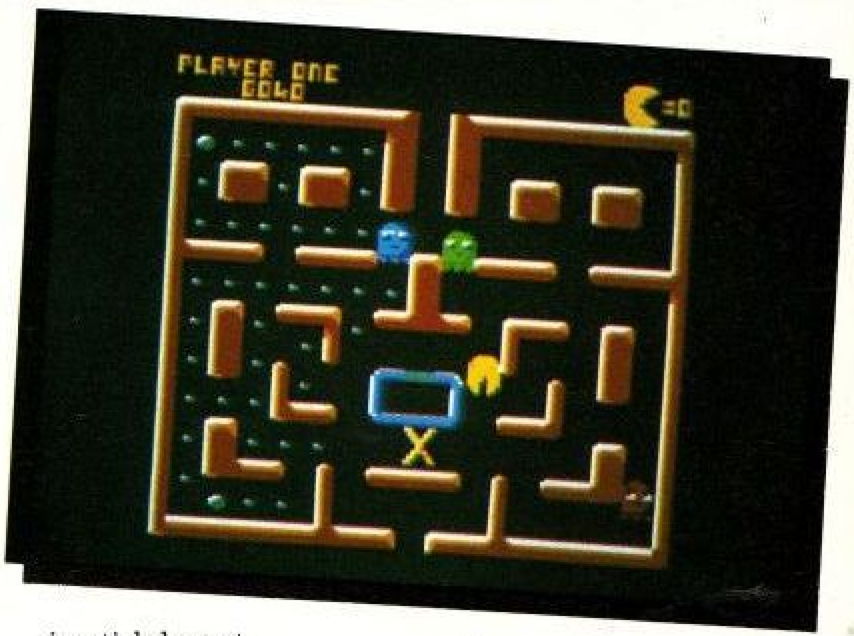
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SOFTWARE REVIEWS

CLASSIC MUNCHER



OK kiddies, let's play a little game. I'll start describing the scenario of this cute little original game by Bubble Bus, and you tell me when you think you can guess the game before it loads All right ? Here we go:

"... Living in a haunted mansion isn't much fun, especially when the ghouls take over. Muncher man must gather up all the food before the ghouls get him !'

No, Muncher Man does not come from Munich, and I don't know why he doesn't get his food from the nearest McDonalds. Maybe he's a trendy veggie? I see you're going to need further clues.

Muncher Man's house looks suspiciously like a maze, with lots of little round bits of food in it (Not yet! Wait a bit). You have to wander about the maze, eating the food, and avoiding the ghouls (now you can start guessing).

When you eat a special pill (left over from a previous police raid), you can chase and eat the ghouls (but go easy on the spirits), getting a large bonus from your local exorcist as you do so.(You must have it by now). Fruits pop up in the maze at random ...

What do you mean, "I haven't got it yet?" Insert tape in ear, press any key and re-read from start. This flippin' well is Pac Man, however deceptive the picture of the dinosaur might be on the cover. Mind you, with names like Classic Muncher, Back Man, or Ghost Gobbling or some such, waddya expect? Asteroids?

You certainly don't get many hints from the loading screen – there isn't one. Another missing link is the sound effects – not exactly stunning, to say the least. At least you can use your own idea of keyboard and/or joystick layout.

The sneaky bit that got me at the end of the first screen was that they went and changed the maze around. You don't see that on many Pac Man clones, though this one certainly swiped enough memory for several different maps.

If you're into being grabbed by the ghoulies in the hedges with some fruit, then you could do worse than buy this one. Bubble Bus are currently running a competition on the high scores. The prize, more software. But don't let that influence you unnecessarily.

Price:£1.99
Author: Bubble Bus

Nigel

Simple ideas are often the best and you don't get much simpler than Pac Man. Bubble Bus may call this Classic Muncher, but no one else will. Still, I don't think they need to worry about Atari Coin-Op taking them to task.

Coin-Op IS still owned by Warner Bros, which isn't as litigation happens Mr Tramiel's outfit.

The game *(oh that – Ed)* is what you'd expect, the sprites are smooth, the gameplay a shade different to the arcade version but it is essentially the same thing. Graphics acceptable, sound unadventurous but all in all it is a reasonable Pac Man. The question is do you want to play a late '70s game in the late '80s?

10/20

Liz

Software history lesson #37: Pac Man was invented in Japan, was bought by Atari and is probably the most profitable arcade game ever. The name derives from pacu the Japanese verb to eat and not – as is often claimed – from Alfred Packer the last American cannibal.

Part of the reason for the success of Pac Man was the non-violent theme, making it popular with girls. As is the Americans' wont, a huge culture grew up around Pac Man with parades, a hit record and high score charts.

The reserved Brits didn't take to the game in quite the same way, but still it is surprising that this is all that remains of a video legend. A nifty cheapo game to bring back memories.

15/20

Colin

As this is unashamedly a rip-off of Pac Man, I'm going to be ruddy critical of it. If you rip stuff off, you've got to do it right.

While loading, you get one of the "No Expense Spared Loading Screens plc." specials, that is, none at all. It's been said that games are best left without loading screens, as it takes quite a while to load 'em in, but some message would be welcome.

The mazes are different, but a wee bit on the small side. On the plus side, it's all very smooth and colourful. Sound could have been a bit better though.

10/20



INTO THE EAGLES NEST

Ach so, der Britischer/Amerikanischer schwein are invading der strongholdings of der commander of der glorious armed forces. Vehaff already captured three of zem, but zis vun has der magic shootenbangen machine-gun mit der 300 round capacity magazines.

Ve must not make life too hard for him, und zo ve leave plenty of der boxes of ammunition lying about. Ze people who really nead it on ze front vill haff to wait.

He need not vorry too much about being schott. Der guards hardly ever use der guns, und even if zey did hit him, he vould not know it. Zis is probably vy dercursed Kaptain K.E. Parker of der dreaded Pandora Software squad has not put in ze screen any vay of telling der health of der Britischer.

Der guards are so dim zat zey lock der doors und leave der keys lying on der floor, just vere der Britischer can find zem. Zis is probably just as vell, or zey vould vander avay und get lost.

To keep him up on ze end of der toes, ve haff lots of der locked interesting boxes lying about too. Ven der looting Britischer finds vun, he shoots off der lid. Inside is maybe der jewels, der gold . . . or maybe der dynamite. Ho ho. Mit der sprengstoffenuppenstuffen und gamen ended.

As vell as shooting der holes in der guards und der boxes, some of der doors (by some oversight) haff been made of ordinary wood und are schotten through mit der shootenfiren machine gunnen. Der person responsible for zis oversight vill be found und deprived of next months *ACU* after joining der three other Britischers vehaff caught for ein little torture party. Ve haff vays of making you buy *ACU!*

For ein Britischer, Lt. R. A. Chapman has surpassed himself und a few others mit der qualitait of zer graphics. All ze aktion is seen from zer bird's eye view (or is zat der eagle's eye view? Ho ho, eine kleine joke). Zer guards are looking like from zer Colditz, zer enemy is looking like zer Robert Redford.

Schould der Robert Redford lookalike successfully release der prisoners und detonate zeir explosivstoffe zat ve haff carelessly left vere zey put it, ve vill be in der schtuck.

Zis style of writing der reviews is not intendings to insult any of der German or Austrian peoples. It is being done to vind upzer spelling checker of der glourious editor.

Author: Pandora
Price : £8.95 (tape), £12.95 (disc)

Nigel

Some games grow on you. Others grow best in compost. This one definitely is for me, and I think, possibly for you too. I could sit in the ed's office for ages playing this with his nifty joystick, and probably would have if I'd not got hungry.

This is a good shoot-up and a mazey adventure game to boot. If only there had been more of a status line. The end sneaks up suddenly on you, and you don't know when to start heading for the nearest first aid box. Apart from that, brilliant.

18/20

Liz

Well it had to happen – a Gauntlet clone with a change of scene. Into the Eagles Nest is WWII Gauntlet, it is one player only and splendid with it.

The enemy sprites are much larger and better animated than those in the US Gold game, the shaded mode 0 graphics look great and the scrolling smooth.

This is the first game from Pandora and it looks to be a winner. So if you fancy a challenge, a really good shoot em up with nifty graphics then venture into the Eagles Nest

18/20

Colin

I don't usually like World War II games, but this is an exception. Lots of action, a mega-maze, realistic sprites and a true sense of danger. From the loading screen to the game over prompt, Into the Eagles Nest reeks of professionalism.

There is a bit of a Rambo – one man against impossible odds – flavour to it but every time I bit the dust I went back for more.

18/20

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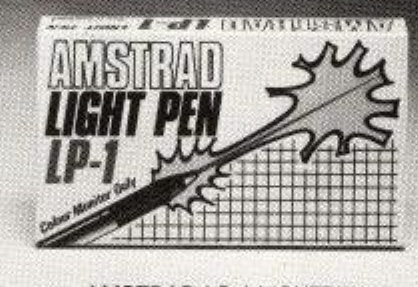
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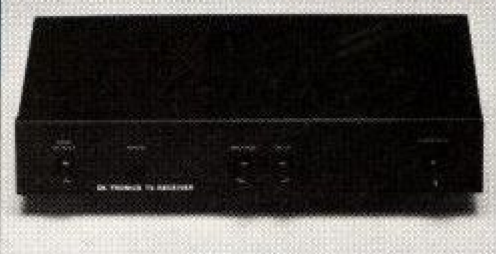
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COBRA



Enter Sylvester "Stallion" Stallone in possibly his biggest movie flop yet: Cobra. The cassette inlay has a big macho picture of Stallone on the front, swinging a laser-sighted HK about, and with a Colt .45 jammed down the front of his trousers. Better be careful on quick draws with that, and when replacing the hot barrel. "Squeaky-voiced" Stallone, they'd call him.

At any rate, forget the shooter for the moment – when you start the game you begin with the humble fist. Weaponry comes off your opponents, via (no, I didn't believe this either) hamburgers.

Kinda hard to swallow is that. Mind you, so are the first Casey- burgers of the morning at Liverpool Street. Like I said, you do for a baddie or a booby-trapped window and it gets replaced by a hamburger. Go past said snack and your weapons and ammunition are miraculously replenished. I've heard they're full of iron, but shome mishtake shurely.

Nevertheless, bash in your sniper or offensive French window and there will be a pulsating hamburger waiting there. Hang on, hamburgers don't pulsate, not even at Casey's.

You'll never guess what the windows are booby-trapped with either. No? OK then, it's a parrot. It is an ex-parrot, it has . . . hang on, wrong sketch. This parrot is an excreting parrot. Get my drift, or should I be dropping more hints?

Apart from the flashing burgers and the pooping parrot, the scenery is just mediocre (for games that is, not the real world), consisting mostly of brick wall with the occasional staircase or window bunged in it.

Oh yes, and the not-so-occasional whore in the background. These can be shot, especially by the wife, but you lose 500 points in the process.

Other colourful inhabitants of this typical American township are knife, RPG, pistol and machinegun toting thugs, and a head-butting duck. I kid you not.

As Stallone, you have an extremely sound constitution, and can take several direct hits from an RPG, bullet, psychotic duck or whatever, but it's much healthier to dodge them.

Being a veteran of many "Rocky" movies, you can leap, punch and duck with ease. Unfortunately, so can the duck. What you really need is a large-bore orange shooter. That'll fix the beggar. Further evidence of the Rocky heritage is the fact that lives remaining is counted in boxing gloves.

The point of this all? There is one, you know. You have to rescue the traditional blonde WAFF (if you're not into acronyms, read weak and feeble female here), she's called Ingrid, as if it mattered.

The contemptible dirty rotten ratfink who swiped her is called The Night Slasher, which is equally unimportant, but makes for a better storyline. And the story is all you'll get, 'cos there's no high-score table to impress your friends with.

Essentially, this is a good old-fashioned piece of mindless violence that you might pick up more than once to relieve boredom. Just thought I'd give you a snake preview.

Author: Ocean
Price: £8.95

Nigel

The streets of America may be dangerous but nowhere can they be this unsafe. It's a good job that you can kill assailants with your bare fists and withstand the force of a rocket launcher. Confronted by such hazards I'd run away very fast.

Unfortunately whichever way you run you are confronted with more of the same. Overall Cobra is monotonous, boring and poorly designed. Another licence exploitation prog. Don't let it exploit you.

8/20

Liz

Standard procedure for every game is to pick up the joystick and start playing. Then when you get stuck – and only after you've pressed every key on the keyboard to see if anything happens – you read the instructions.

I started playing Cobra and it seemed reasonable. I figured out the hamburger bit and was confused by the way you need to jump first up and then sideways to get on to a higher ledge. So it seemed reasonable to read the instructions and sort out what was supposed to be happening.

Then my opinion changed. There was no more to it. Worraripoff. The sprites are poor and jerky, the plot as credible as your average Stallone movie and the whole thing overpriced.

14/20

Colin

Wot a load of old cobras, I've never seen such confused trash in all my life. Hamburgers my armpit! I know Stallone's supposed to be a bit of a beefcake, but this is ridiculous.

I couldn't help noticing that the screen occasionally went into a quivering fit after passing booby-trapped windows. Also it seemed to halt for a while at it's own convenience. Nothing about that in the instructions.

This looks a bit like someone took Green Beret and ran it through some kind of zanification process. The result? For some peculiar reason I found it enjoyable.

6/20

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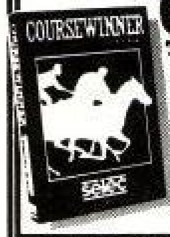
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SIGMA 7

After Combat Lynx, Durell games earned a reputation of taking three hours to play, and an obligatory university degree to comprehend the instructions. Not this one. This is a shootey-uppey game with some of the slickest graphics yet.

The opening sequence (once you're through with all the anti-piracy tosh) of your little gunship is breathtaking. So much so that it takes you a while to realise that the default playing option is via the keyboard, and you have to abort the game to select joysticks.

Things soon get moving, the space-station-cum-runway scrolls off and aliens resembling green sandwiches fly on in formation. Knocking off these is a piece of pizza, once you get used to moving the stick up and down instead of left to right. Most of the people I saw playing it turned the joysticks through 90 degrees.

Firing fast and furious, it's possible to completely obscure the view ahead with bits of disintegrating alien. This is a bit of a problem, 'cos sometimes they sneak up on you unawares through the bits of savage sandwich filling and banners proclaiming "100 points".

At the end of the invasion of the sarnie-snatchers is an automated docking sequence to sit through while you bandage the old trigger finger.

Stage two is completely different, but still viewed in perspective. Your character now plays the part of a creature that is not sufficiently unlike K9 for it to be pure coincidence. K9 moves along a maze-like pathway eating up flashing smarties, not entirely unlike Pac Man. You don't seem to get much of a score for smartie nibbling, though.

Some smarties are completely inedible to K9's electronic innards. The pattern these form is used in the third (and final) part. The baddies this time take on the shape of whole rounds of green sandwiches, appearing and disappearing at random in a psychedelic DNA-type spiral. You can toast these sarnies with K9's snout-laser, and gain points. Wot do points make? (prizes?)

Soon the little countdown alarm flashes à la cheeping LED alarm clock. Now is the time for all good doggies to come to the aid of the third stage. Bad dogs can hang around and do some sandwich-blasting for a few extra points before legging it.



The third stage is a bit strange. K9 transmutes into a gobstopper, and has to push buttons in when they go yellow. Remember the bit about the inedible smarties? Well, that is the pattern you have to form on the buttons.

Difficult enough, so the sparkley thing that tails you round the board doesn't help a lot. You see, if you bounce him instead of a button, your gobstopper goes to that big sweetie jar in the sky. Not only that, but there's a time limit on it.

All in all, a very satisfying game. Part 3 is a bit dull, but parts 1 and 2 make up for it. Of course, if you complete it, you go round and round and round and . . .

Author: Durell
Price: £7.95

Nigel

The graphics on this ain't half bad, in fact they make it. If the thing wasn't in perspective, it would all be rather boring.

I never got to play it on a monochrome monitor, but I should imagine that the button colour changes will be a bit difficult to spot, bright green looking much the same colour as bright green and all.

17/20

Liz

This is a cross between Zaxxon and Crystal Castles. I found the space scenes a trifle dull, but the shooty Pac Man bit was fun. As with any 3D game the controls take some mastering.

The boxed scores look a bit comic and the explosions are pleasant, but there was nothing to get the adrenalin flowing. I tried the game on a green screen and the playability does suffer but with the contrast turned up it is still playable.

12/20

Colin

Since Arnold was born, software houses have complained about the 16k of screen memory being difficult to scroll. This shows in Sigma 7, the large objects, like your launch pad, scroll jerkily – not Durell's fault, more the mistake of attempting the impossible.

Zaxxon offers a height gauge and a shadow in the planet scenes. This is missing from Sigma 7, making it hard to judge your relative position. A bit samey.

14/20

SHOCKWAY RIDER



Question: How do you get ahead in this game? Answer: You pick it up off the shockway.

Yeah, this is one game of really mindless, gutsy, bloodthirsty violence (so why did I score so badly ?). It's all about spoiling innocent civilians' Sunday afternoon strolls on the moving walkways round the city. Not only spoiling them, but knocking seven kinds of whatever out of them while you're at it.

The overall effect is rather like rush-hour on the tube.

Some of the local yokels are just as bad as you are, noggin on the pavement. In true yobbo tradition, the opposition can be eliminated with uppercuts, bottles and bricks.

So can innocent bystanders. All disintegrate with appreciable clouds of naive smoke and appropriate guiltless noise, even the punks.

Some erks are dumb enough to sit in your way: they should get what's coming to them (. . . another one bites the dust, hey hey).

When the wrong one, that is you, gets decapitated (head hits the sidewalk, blood trickles in thick rivulets), all vigilantes present turn and do a creditable "Yar boo sucks" gesture in your general direction. This doesn't help us sore losers any.

As you progress through the mess of freshly de-bodified heads, things get trickier. Some bright spark decides it's a fun thing to build razor-edged barriers across the shockway. Not being an exponent of the ancient art of limbo dancing, you get de-nutted on impact (that means yer head, mate).

In the demo, targets flash by on the higher levels. In practice, it takes a while to get that far. I didn't make it. Any way you do it, etiquette practically dictates that you make a complete circuit of the city, and if the devil doesn't take the hindmost, the shockway riders certainly will.

Author: FTL
Price: £8.95 (tape), £13.95 (disc)

Nigel

Sounds like the scenario of the walkways in Asimov's Caves of Steel, except more gruesome and there aren't so many cops. There only being all of three lanes, you don't get a lot of room to manoeuvre in, so you timing is critical. Mine is terrible.

Amazingly smooth scrolling on this; not a hint of flicker, even while changing lanes or passing people. And I love the spare heads, heavily garnished with tomato ketchup. Once mastered, this one is going to brighten up the lives of many a potential jaywalker, mugger, thug, punk . . .

18/20

Liz

Yuk! This game is sick, putrid, rank, foul and in the worst possible taste. If CRL's Dracula was awarded a 15 Certificate then this wouldn't pass an 18. The idea of half a skull laying on the moving walkway is horrid. And yet despite my revulsion I returned for more.

The catchy tune, bright graphics and addictive qualities had me going for days. I am ashamed to admit that I enjoyed playing this game. Buy it if only to disgust your parents.

16/20

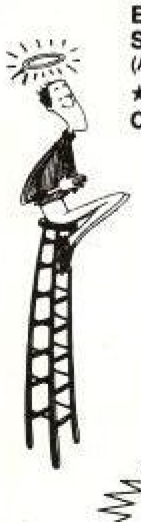
Colin

Imagine Infodroid in 3D and you get an idea of what Shockway Rider is about. Out goes the strategy and planning, in comes the gore.

Travel around the city of the future avoiding muggers but earning bonus points for lobbing the odd half brick at an unsuspecting granny. Later you graduate to mail bags and target practice.

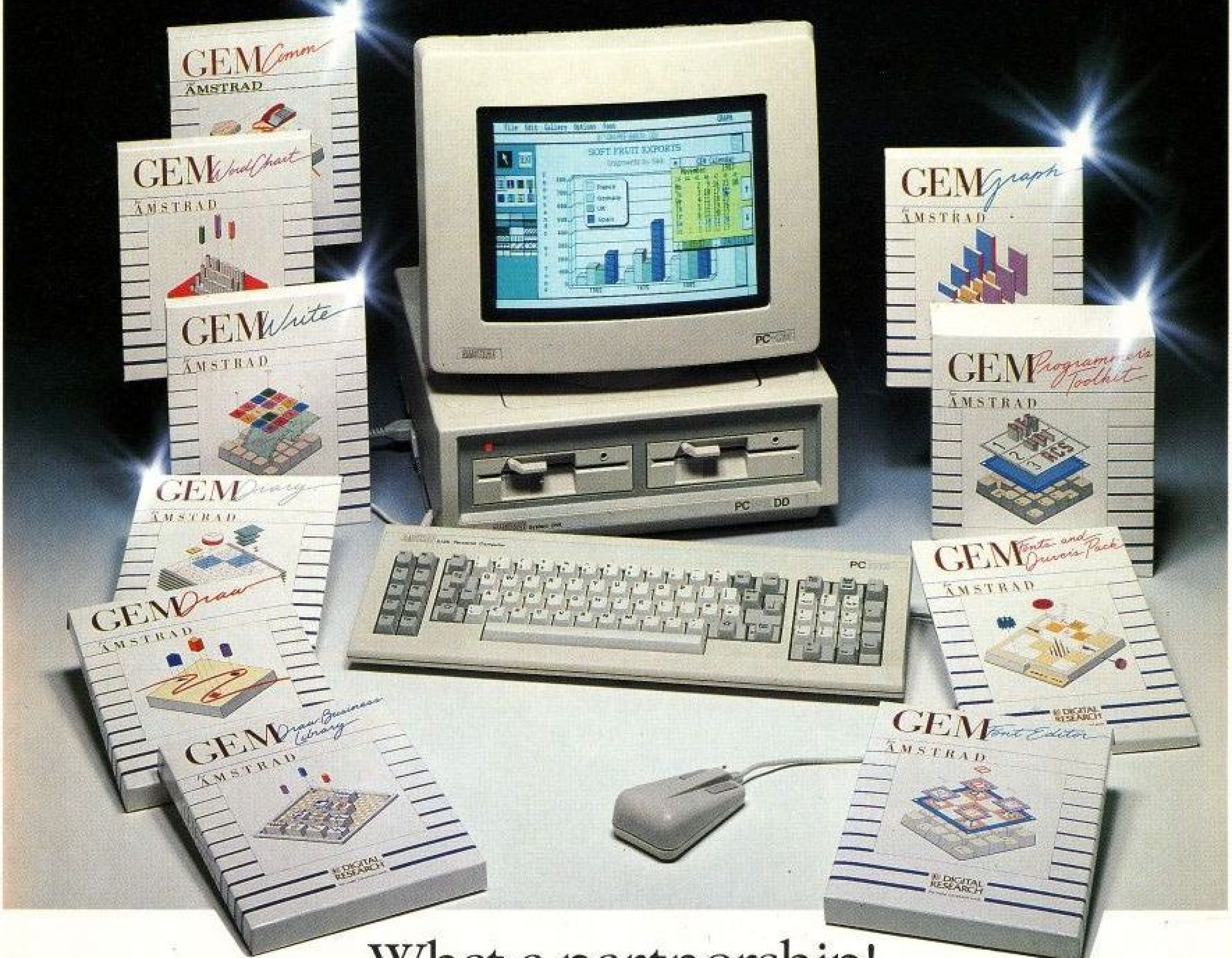
Throwing missiles across the tracks is a difficult skill to master, and not needed until the later levels. Ideologically unsound, actually very good.

19/20




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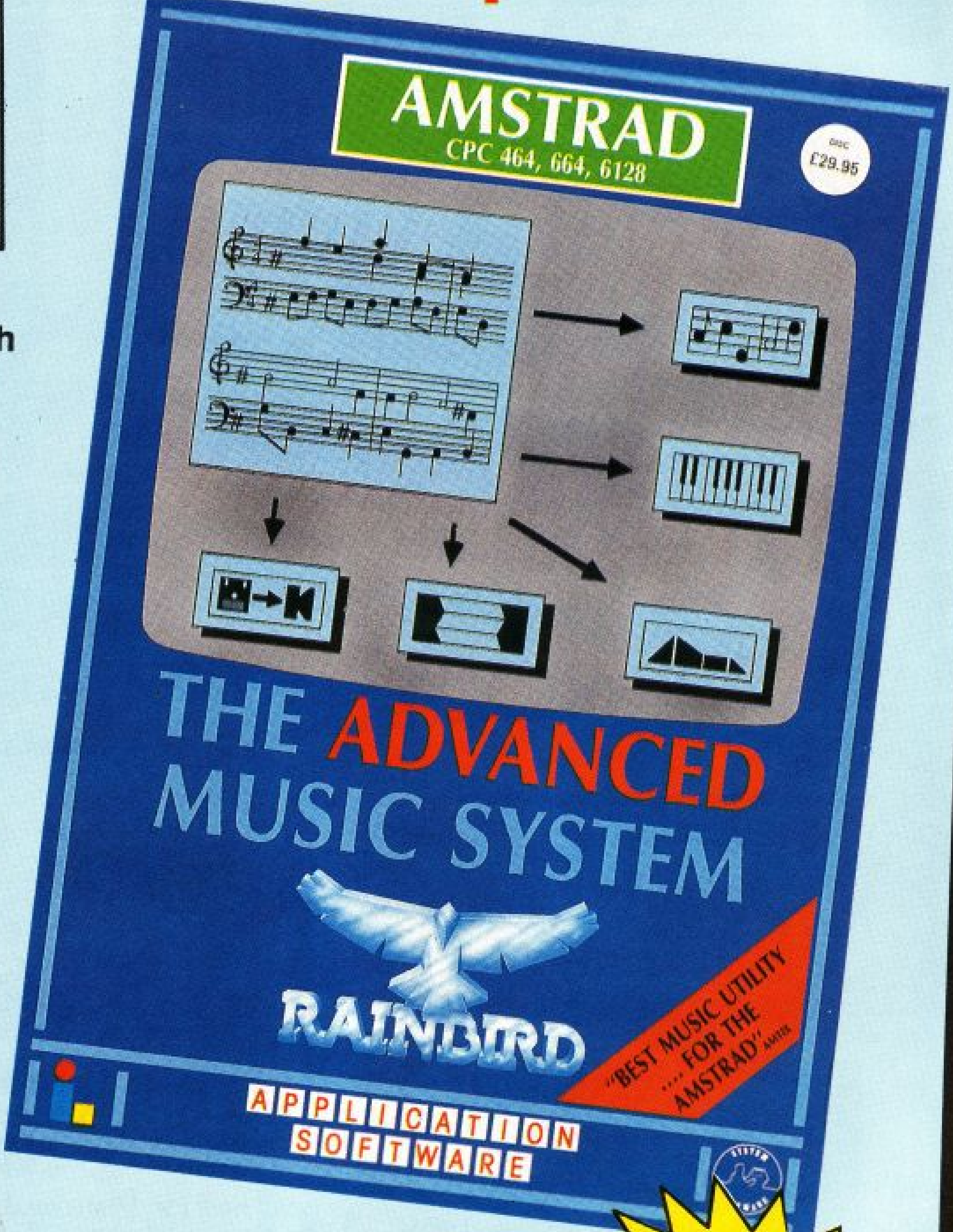
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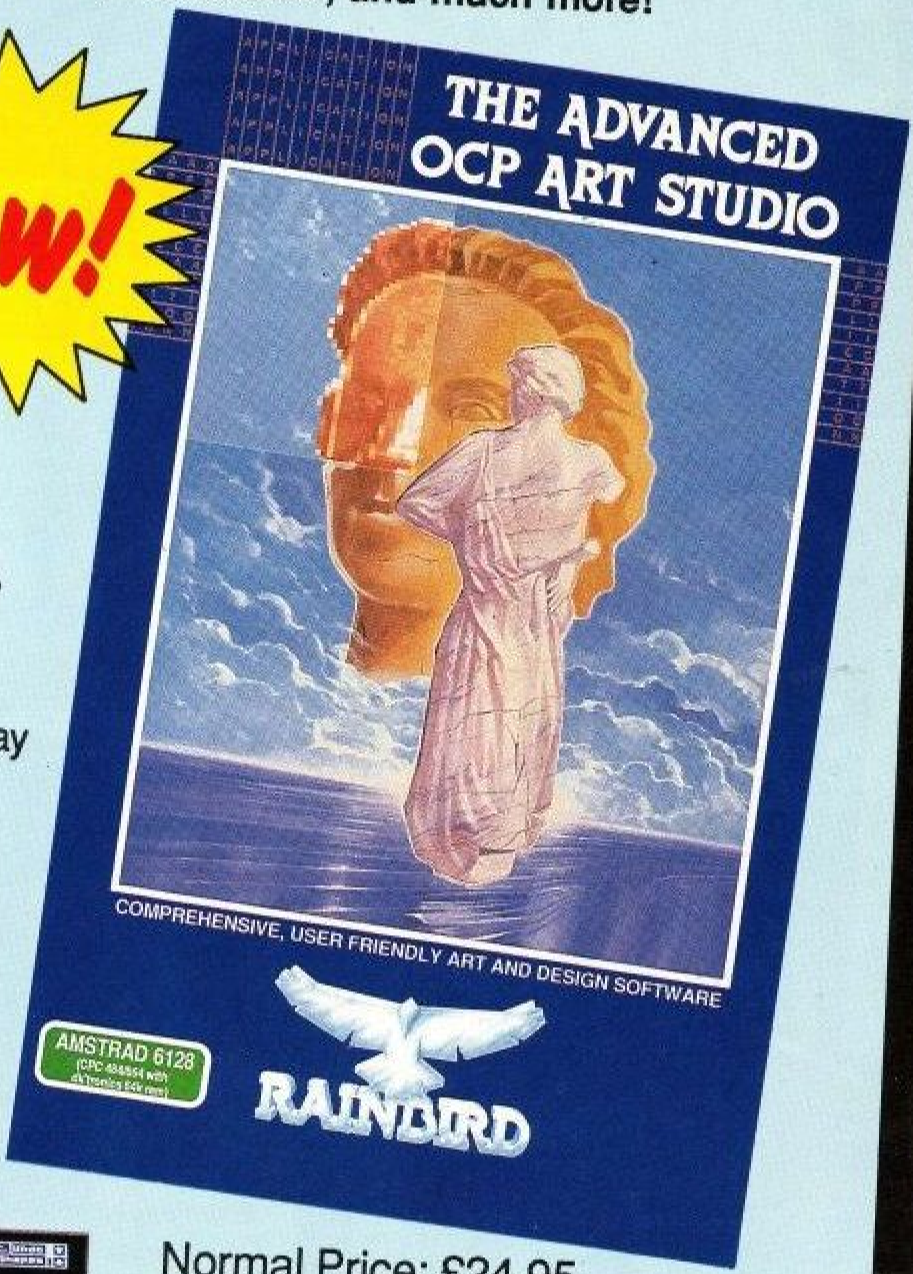
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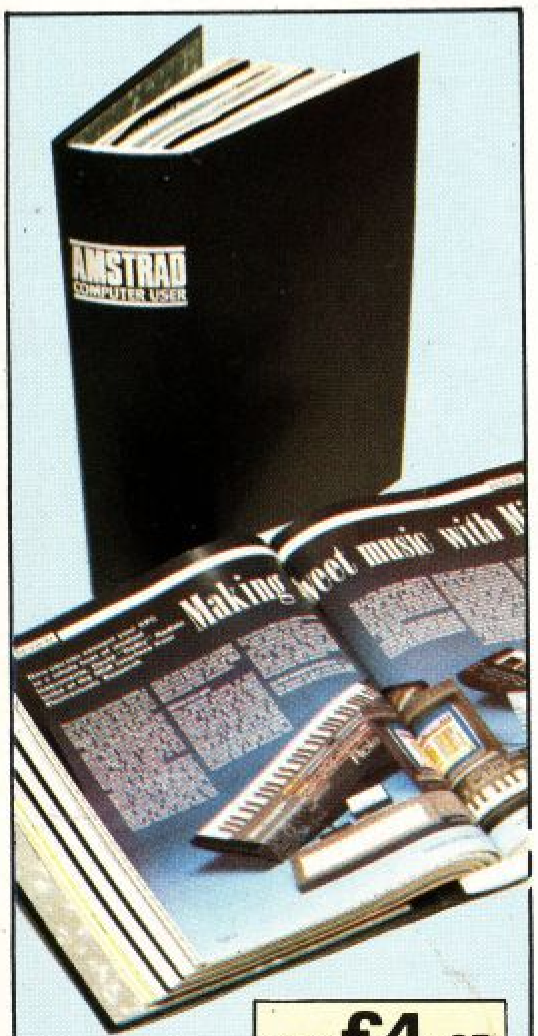
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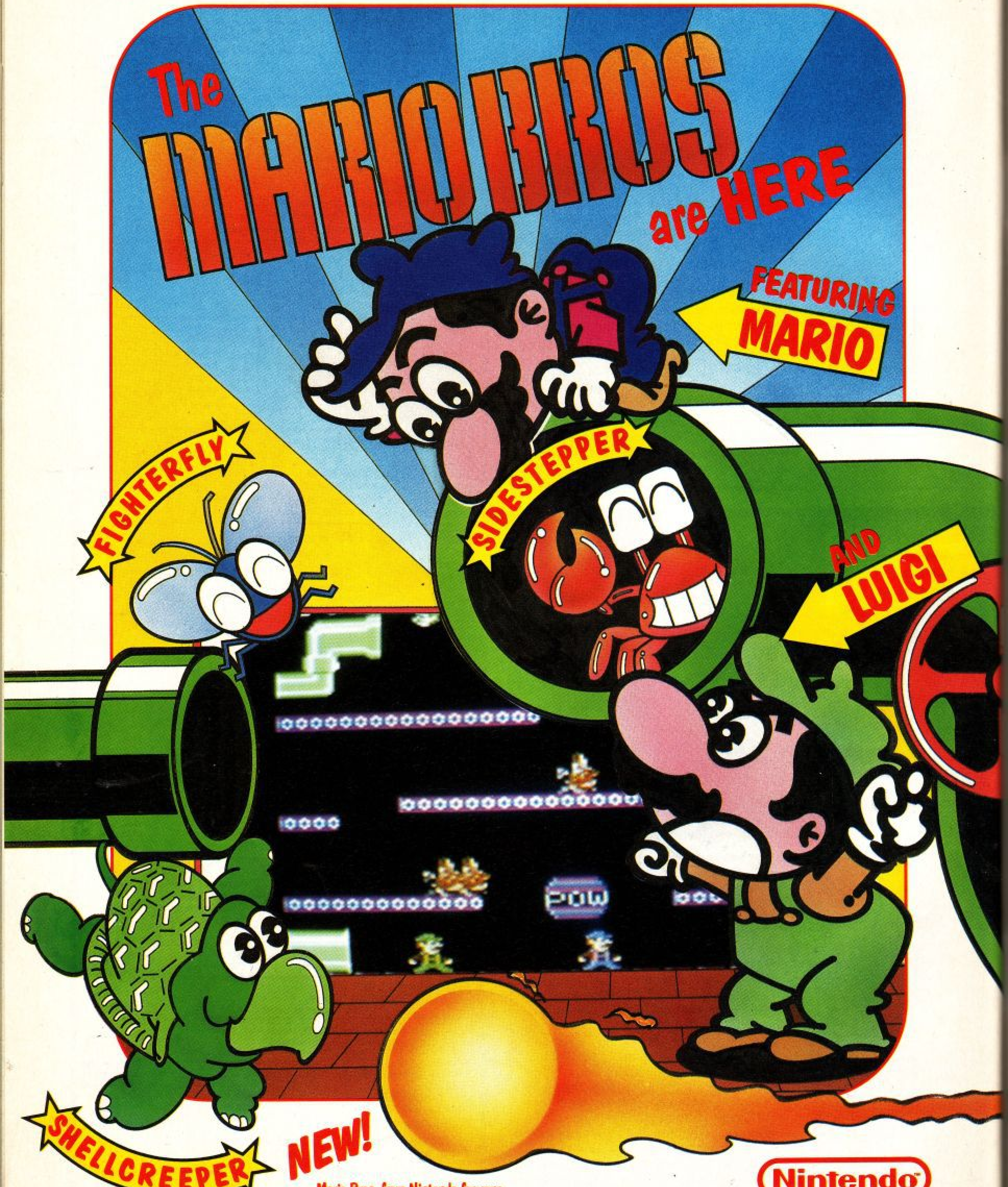
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The Least Significant Bit

The Which? Computer Show brought the return of Sir Clive – you need to be careful not to call his machine a Sinclair. Amstrad owns his surname (but not his Sir name).

The foolish editor let nostalgia and his cheque book run away with him, producing an ink filled Parker to swell the coffers of the good knight. Since he had trekked to Brumm with instructions to buy a Z88 for a like-minded friend he made out the order for two, to include postage and packing.

Being as numerate as the average aardvark he failed the simple addition test and resorted to using the Z88 to do the calculation. Two machines each at £229.95, a Ram pack at £49.95, p&p £7.50. Right type that into Sir Clive's squidgy keyboard and write a cheque for: £517.3500001, Humm some debugging needed here I think.

Alan Sugar need not worry about the new black beast, so it is some surprise that he asked the techie wiz at a top Amstrad distributor what he thought about the Z88. "Well," replied the engineer, "it's small, so it's going to get hot. I think it needs a fan". Such *chutzpa* earned an unusual response from Mr Sugar – silence.

Fond memory

Many magazines have a page of chat at the back, a bit like LSB. PCW offers Chip Chat, Smash Hits has Mutterings and Acorn User offers Acorn Abuser. It is this last column which caught the eye of Amstrad bigwigs shortly after the CPC launch, when Acorn were mighty and Amstrad were Audiophiles (who's laughing now Luigi?).

Abuser reviewed a Hi-Fi complete with twin speed disc drive (33 1/3 or 45 rpm), and tape interface. What annoyed the men at Brentwood towers was that the photo used was not of an Amstrad tower system but of a rival – not too distant in name from that of The Duchess of York.

Chart Busters

Never too proud to steal an idea – plagiarize, plagiarize remember why the good Lord made your eyes, but always call it research – LSB offers the top 10 games for 1999.

1. Computer Hits 10 Vol 97 – Beau Jolly
2. Bombjack 23 – Elite
3. Pong – official licence – Ocean
4. Naff James Bond game – Domark
5. Formula 1 Simulator – Mastertronic
6. Knight Tyme 1999 – Mastertronic
7. A little bit more advanced but not quite as advanced as next week's version Art Studio – Rainbird
8. Star Trek – Beyond
9. Blue Peter – the game – Macsen
10. Zaxxon – Amsoft

How to be a pest

If you want to annoy a PCW owner make it go beep. If you *really* want to annoy a Joyce owner then hold down a key, make it beep and pull out the keyboard plug. The machine won't stop beeping.

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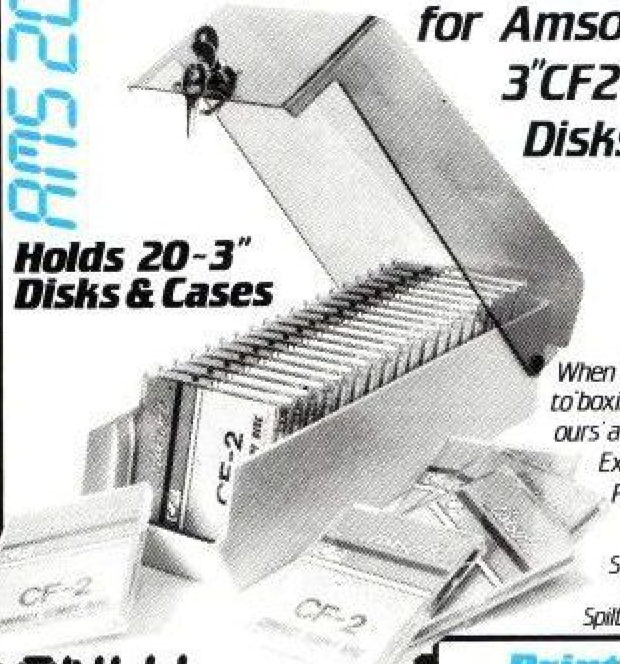
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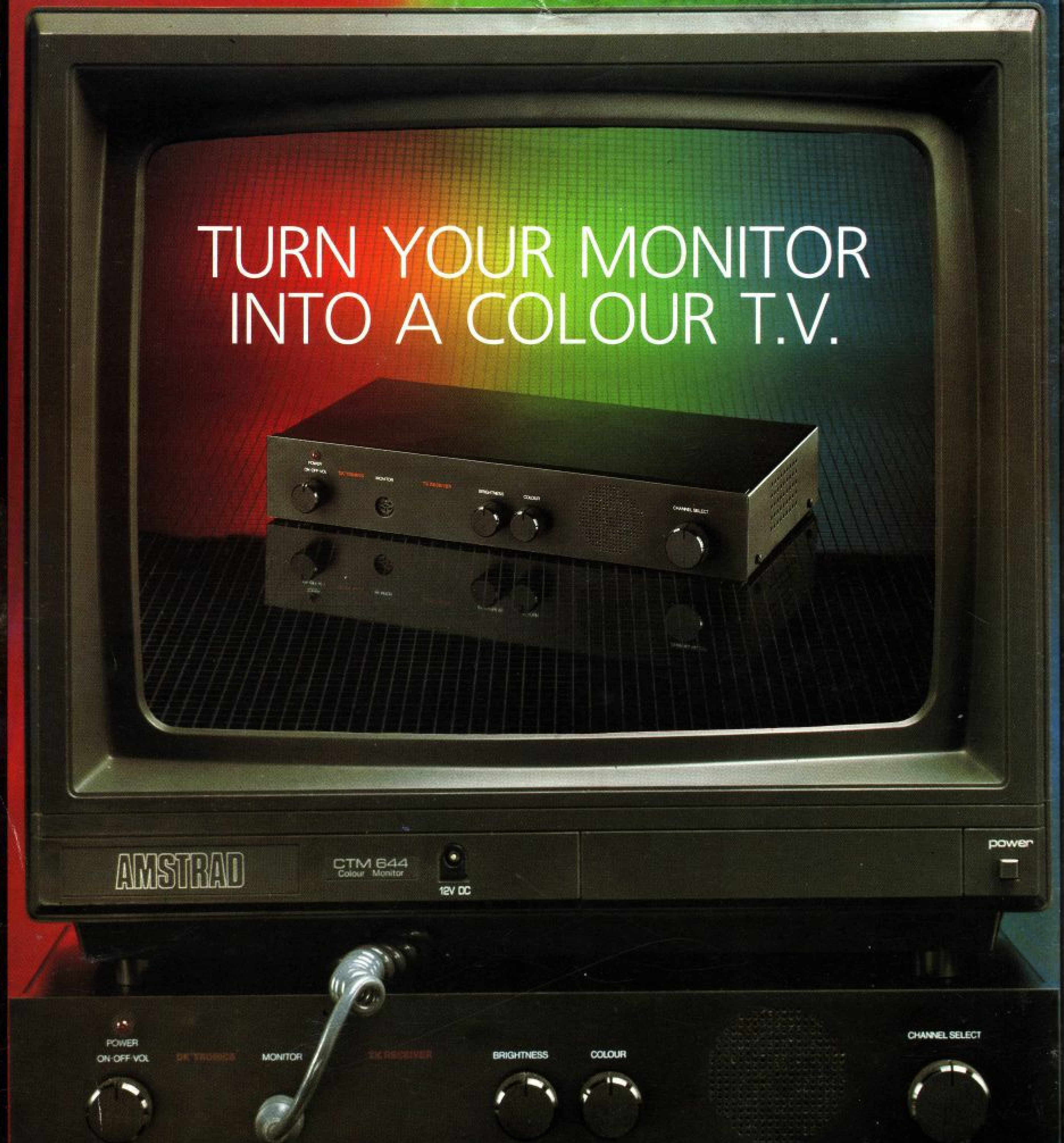
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